

APPENDIX D OTHER STUDIES

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Sunflower Wind Project Critical Issues Analysis

Infinity Wind Power

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Prepared for

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1.0 INTRODUCTION

1.1 BACKGROUND

Sunflower Wind Project, LLC, a wholly owned subsidiary of Infinity Wind Power (Infinity) contracted HDR Engineering, Inc. (HDR) to prepare a critical issues analysis (CIA) for a proposed utility-scale wind energy project – the Sunflower Wind Project – located in west central North Dakota. This CIA identifies potential development constraints on the proposed project related to publicly available data on biological, archaeological, cultural, historical, surface hydrological resources, and land use within a study area defined by Infinity. The CIA is based on a desk-top evaluation of the environmental characteristics of the study area. The information presented in the analysis was obtained from the following:

- ESRI ArcGIS online aerial imagery, streets, and basemap information
- United States Geological Survey (USGS) streams and rivers data
- Public lands data: federal lands, state lands, and county lands
- Municipalities and counties
- USGS GAP analysis land cover data
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps
- USFWS county-level species information
- Federal Aviation Administration (FAA) registered airports data
- Department of Defense (DOD) Preliminary Screening Tool
- Federal Communications Commission tower data
- USGS topographic maps and digital elevation data
- U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) data
- North Dakota Department of Transportation data
- North Dakota Geological Survey data
- North Dakota State Water Commission data
- North Dakota GIS Hub data

The final section of this CIA discusses permits and approvals that may be necessary for construction of the project. Figures are presented after the permits and approvals matrix. Appendix A contains the Department of Defense Preliminary Screening Tool results for the study area. Economic coal deposit maps are found in Appendix B. Appendix C contains the North American Breeding Bird Survey results for the study area vicinity.

1.2 PROJECT LOCATION

The 15,600-acre study area lies within Morton and Stark counties, North Dakota. The nearest communities to the study area include Hebron to the north, Glen Ullin to the east, and Richardton to the west (see Figure 1). Table 1 lists the townships and sections within the study area. Townships are not organized into civil townships; civil townships are common in several parts of North Dakota, and often require additional permitting.

Table 1. Counties, Townships and Sections within Project Study Area

Township	Range	Section
138N	90W	4-6
138N	91W	1,2
139N	90W	16-23, 26-33
139N	91W	23-25, 35, 36

1.3 POPULATION INFORMATION

Table 2 presents population information obtained from the U.S. Census Bureau 2000 Census and 2009 Census Estimates for the municipalities and small towns near the study area. Hebron is the nearest community, located 2 miles north. Glen Ullin and Richardton are located 7 miles and 8 miles from the study area, respectively.

Table 2. Population Estimates for Counties, Cities, and Townships near the Study Area

County/Township/Town	2000 U.S. Census Population	2009 U.S. Census Estimate
Morton County	25,303	26,464
Stark County	22,636	22,247
Hebron	803	725
Glen Ullin	865	796
Richardton	619	577

2.0 ENVIRONMENTAL CHARACTERISTICS

2.1 LAND USE

Stark and Morton counties' primary land use is agricultural. Typical crops include wheat, hay, barely, oats, and corn. Raising livestock (cattle, hogs, sheep, and horses) is another important land use. More information on agriculture is included in the Land Cover section below.

Land Cover

According to GAP land cover data (Figure 3) the study area is a mixture of cropland with interspersed rangeland made up of fallow parcels (classified in the GAP data as planted herbaceous perennials) or grassland/prairie. Grassland/prairie is mostly associated with steeper terrain. Rangeland in these areas is not likely to have ever been tilled. Riparian areas are likely to contain shrubs and small trees. Wetland basins are common but most are less than five acres and support only seasonal surface water. Most streams within the study area are intermittent and, in many cases, function as drainageways within tilled agricultural fields. Table 3 shows the acreages of each land cover type based on GAP data.

Table 3. Gap Analysis

Cover Type	Total (Acres)*	Percentage of Study Area
Cropland	5,645	36.3
Grassland/Prairie	4,474	28.8
Planted Herbaceous Perennials	4,195	26.9
Shrubland	489	3.2
Barren	274	1.8
Wetlands	216	1.4
Woodland	213	1.3
Developed	49	0.3
Total	15,555	100.0

* Rounded to nearest acre.

Public Lands

- Public and private parks and trails (Figure 2):
 - There are no public or private parks within the study area. A cemetery is located in the southwestern corner of the study area in Section 2 of Township 138N, Range 91W.
 - There are no designated multi-use or snowmobile trails in Stark or Morton counties (State of North Dakota 2009).
- USFWS Easements**—USFWS administers a program by which it holds easements on private lands that have wetlands and/or grassland habitat. Development may be restricted on lands held in a USFWS easement. As the USFWS does not provide specific easement data to the public; consultation regarding possible easements on private lands that have documented wetlands or grassland is recommended.
- Programmatic Environmental Impact Statement**—Western Area Power Administration (WAPA) and the USFWS are in the process of preparing a Programmatic Environmental Impact Statement (PEIS). This document is intended to identify potential environmental impacts associated with wind energy development and associated transmission systems; to identify mitigation strategies, standard construction practices, and best management practices to reduce potential impacts; and to establish a comprehensive environmental program for evaluating future wind-energy proposals. The draft PEIS is scheduled to be published in fall 2010 and a Record of Decision is to be published in 2011. Once finalized, developers can expect that avoidance, minimization, and mitigation measures identified in the PEIS will be required for all wind projects that occur on USFWS easement lands. Currently, there is a process (through providing a reversionary clause) for allowing wind development on USFWS grassland easements. However, this process requires extensive coordination and a project-specific review under the National Environmental Policy Act.
- Wetland Management Districts (WMDs)** – No WMDs are located in or within 5 miles of the study area. WMDs are lands purchased by the U.S. Bureau of Reclamation (Reclamation) as part of North Dakota’s Garrison Diversion Unit. Reclamation developed these areas for wildlife by restoring drained wetlands and planting cropland acres to grassland. The WMDs were transferred to the USFWS to be managed primarily for the production of migratory birds and for

public use. The closest WMD is located 21 miles southwest of the study area in Hettinger County.

- **Wildlife Management Areas (WMAs)**—WMAs are state-owned lands managed by the North Dakota Game and Fish Department (NDGFD) for wildlife habitat. There are no WMAs in or within 5 miles of the study area. The closest is the Storm Creek WMA in Morton County located 18 miles east of the study area. The Heart Butte Reservoir State Game Management Area is not a WMA, but is managed by the NDGFD and is located 16 miles southeast of the study area. This area is a reservoir used for fishing and hunting.
- **Bureau of Land Management (BLM) Recreational Areas** – The Schnell Recreation Area is located 9 miles west of the study area. The recreation area is a converted ranch that provides rustic camping, wildlife viewing, and environmental education opportunities.
- **State Trust Lands**—No state trust land parcels exist within the study area. One state trust land parcel is within 2 miles of the study area (Figure 2). Trust lands are administered by the North Dakota State Land Department.
- **Private Land Open to Sportsman (PLOTS)** — No PLOTS are located in or within 0.5 miles of the study area. These are private lands that are open to public hunting. These lands are enrolled in one of three NDGFD programs to enhance fish and wildlife populations for sustained public use. These lands may be jointly enrolled in other federal programs such as the Conservation Reserve Program described below.
- **Natural Resources Conservation Service (NRCS) Conservation Reserve Program (CRP)**—Under CRP, landowners are compensated for taking agricultural land out of production for a set contract period for which payments are made on a per-acre basis. While wind development is allowed within CRP parcels, coordination with landowners and the NRCS is necessary to withdraw the impacted areas from the CRP contract and to compensate the NRCS for any payments already distributed for those areas. HDR recommends contacting the NRCS Beulah Field Office to identify which lands are enrolled in CRP; permission from the individual landowner of each parcel is required to gain access to CRP data.
- **U.S. Department of Agriculture (USDA) Loan Coordination**—The study area is located within a rural agricultural area. Land under loans from the USDA requires special coordination with the USDA if project activities are proposed within those parcels; this coordination can include a modified National Environmental Policy Act (NEPA) review. HDR recommends contacting the USDA to identify which lands have loans from the USDA; permission from the individual landowner of each parcel is required to gain access to USDA loan data.

2.2 PUBLIC SERVICES AND INFRASTRUCTURE

Figure 1 shows roads and railroads in the study area. Airports within a 25-mile radius are shown in Figure 4. Figure 5 shows the locations of Federal Communication Commission (FCC)-licensed towers and existing transmission lines.

- **State, county, and local roads**—Figure 1 shows state and county roads within the study area. Roads in the study area follow section lines. A transportation assessment should be completed to evaluate potential access routes and identify improvements necessary to facilitate project construction and operation. Stark and Morton counties and the North Dakota Department of Transportation (NDDOT) may require highway crossing permits for any utility crossings of county roads. The North Dakota Public Service Commission (PSC) has voluntary turbine fall-down setbacks from public roads. Stark and Morton counties have not established any setbacks specific to wind development.

- **Airports and Heliports**—There are two public airports and four private airports within 25 miles of the study area (Table 4). Setbacks from public and private airports follow North Dakota Aeronautics Commission and FAA requirements. The North Dakota Aeronautics Commission has provided guidance on other wind projects related to safety for crop dusting aircraft to decrease their risk of colliding with anemometers and turbines.

Table 4. Public/Private Airports within 25 Miles of the Study Area

Airport Name	Type	Distance from the Study Area (miles)
Chase Airstrip	Private	4
Glen Ullin Regional	Public	6
Richardton	Public	11
Brands	Private	15
Fitterer's Strip	Private	16
Jurgens Airstrip	Private	17

- **Railroads**—An east/west rail line, operated by Burlington Northern Santa Fe Railway, runs to the north and east of the study area crossing Highway 94 (Figure 2).
- **Pipelines**—No interstate pipelines have been identified within the study area.
- **Transmissions lines**—A 230 kV transmission line parallels Highway 94 through the northern portion of the study area (Figure 5).
- **FCC Towers**—Two private land-mobile communication towers are located within the study area (Township 139N, Range 90W, Sections 20 and 32). One microwave transmission tower is located within the study area (Township 139N, Range 90W, Section 21). Seventeen registered microwave towers are located on a large hill 1.5 miles west of the study area (Township 139N, Range 91W, Section 16). The presence of a microwave tower within the study area and the proximity of a large array of microwave towers increase the likelihood that the study area will contain microwave beam paths. HDR recommends completing a microwave beam path analysis to determine their presence in the study area.

Military Facilities, Aviation and Weather Radar

The FAA's online *Department of Defense (DoD) Preliminary Screening Tool* (DoD Tool)¹ allows developers to gain preliminary insights regarding potential impacts that structures may have on long range radars, military training routes, and special use airspace prior to official filing of an Obstruction Evaluation/Airport Airspace Analysis request with the FAA. This tool does not replace any official processes or procedures that may be required by the FAA.

The Long Range Radar Screening type produced the following results:

- **Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.

The NEXRAD screening type produced the following results:

¹ FAA Disclaimer: The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long Range Radar(s), Military Training Route(s), and Special Use Airspace prior to official OC/AAA filing. This tool will produce a map of the structure and nearby military airspace or Long Range Radars. The use of this tool is **100% optional** and will provide a first level of feedback and a single point of contact within DoD to discuss impacts/mitigation efforts on the military training mission. **The use of this tool does not in any way replace the official FAA process/procedures.**

- **Green:** Minimal to no impact to Weather Surveillance Radar-1988 Doppler (WSR-88D) weather radar operations. National Telecommunications & Information Administration (NTIA) notification advised.

The Military Operations screening type produced the following results:

- The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Dr. Thomas (Thom) H. Rennie at the USAF Regional Environmental Coordinator at (214) 767-4678 for confirmation and documentation.

2.3 CULTURAL RESOURCES

Archaeological and Historic Facility Resources

Archaeological and historic facility resources represent the visible or otherwise tangible record of human activity on the landscape. These resources vary in size, shape, condition, and importance, among other considerations; some are clearly evident on the landscape, while others are buried or only visible to knowledgeable people.

Records were reviewed through the National Register of Historic Places (NRHP) online database which can be accessed at <http://www.nps.gov/history/nR/research/>. This database was used as an initial search to see if any NRHP listed resources were in or near the study area.

It is anticipated that this project falls under multiple state statutes encompassed in the North Dakota Century Code, including:

- 55-03-01, which requires permits to investigate, evaluate, or mitigate adverse effects on cultural resources, historic buildings, structures, or objects under section 106 of the National Historic Preservation Act of 1966.
- 55-03-01.1, which requires permits to investigate, excavate, or otherwise record cultural resources on land owned by instrumentality of the state of North Dakota and to excavate cultural resources on private land.
- 23-06-27, which outlines the protection of unmarked burials and the penalties for their disturbance.
- 55-02-07.1, which protects site locations of prehistoric or historic sites. This statute limits access to, and release of information from, files of the State Historical Society of North Dakota until the director is satisfied that the applicant has a reasonable need for the information and is assured that the release of the information will not result in unnecessary destruction of the resource.
- 55-1008(2), which offers protection to sites listed on the State Historic Sites Registry.

Resources are typically categorized by type and significance. The status of a resource is completed for compliance with federal regulations, typically Section 106 of the National Historic Preservation Act of 1966 (as amended) (NHPA), by applying the National Register Criteria for Evaluation developed by the National Park Service (Bulletin 15 completed by the staff of the National Register of Historic Places, finalized by Patrick W. Andrus, edited by Rebecca H. Shrimpton, 1990, Revised 1991, 1995, 1997, Revised for Internet 1995, 2001, 2002).

The status of a resource can fall into three possible categories: not eligible, not evaluated, and eligible. A cultural resource is determined “not eligible” when a federal agency has determined that it is not eligible for the NRHP. Such resources do not require further investigation. A cultural resource is considered “not evaluated” when a federal agency has not made any determination as to its eligibility. Further work is

needed to understand the significance of the cultural resource. A cultural resource is considered “eligible” when a federal agency has determined it to be of value and significant enough to be listed on the NRHP. Coordination with the “appropriate parties” is needed to discuss project impacts as they relate to the resources.

Resource status is useful for project planning purposes. In addition, when resources have not been evaluated for significance and will be physically impacted by the project, coordination with State Historic Preservation Office (SHPO) to address the impacts will be needed.

Recorded Archaeological and Historic Facility Resources

The online NRHP database was searched for registered properties in Morton and Stark counties located in and within 1 mile of the study area. No NRHP registered archaeological or historic facility resources were found.

The absence of listed archaeological and/or historic facility resources does not mean the project area is clear of significant resources. It is possible there are both recorded and unrecorded resources in the project area that may be significant, but which have been neither evaluated nor had their status determined.

Possible Concerns or Effects

Possible concerns that should be considered for this project include:

- Unrecorded cultural resources located within the study area
- Any ground disturbing activity within the study area that has potential to impact known or unknown cultural resources
- Visual impacts to recorded or unrecorded cultural resource properties

Recommendations

No NRHP properties were identified in or near the study area. However, it is likely that unevaluated or unknown resources may be present within or near the project area that may be significant. To assist in initial development of a project layout, HDR recommends that a literature search be completed for the study area to identify previously recorded cultural resources. Additionally, HDR recommends that a field survey be completed in the study area prior to construction to identify unrecorded cultural resources that should be avoided. Typically, this includes a field survey for undiscovered cultural resources located (buried or on the surface) within the area that could potentially be directly disturbed by construction activities. Additionally, an evaluation of historic structures within the general project area is sometimes appropriate to inform project development.

If federal permits (e.g. USACE Section 404), federal funds, or federal review under NEPA is required or used in any part of this project, then Section 106 of the NHPA would be applicable. If Section 106 is applicable, a field survey (Phase I Field Inventory) and a formal determination of a resource’s eligibility under the NRHP (Phase II Evaluation) will likely be required to consider both recorded and unrecorded above-ground resources.

Taking into consideration the types of climate, agricultural practice, and land use present in the study area, the most probable periods for completing field surveys for archaeological resources would be after spring thaw and before fall freeze, preferably before agricultural land becomes fully grown, or after agricultural land has been harvested. However, in area where the primary land use is range or pasture land, survey work could take place from spring thaw to fall freeze. An evaluation of historic structures can be completed at any time of the year, but seasons with minimal vegetation cover are more ideal.

2.4 GEOLOGIC AND GROUNDWATER RESOURCES

Elevation and Topography

Topography within the study area is slightly rolling to rolling, with the steepest topography occurring to the southwest (Figure 6). The elevation ranges from 2,231 feet (680 meters) to 2,362 feet (720 meters).

Geology and Groundwater

Surficial geology within the study area consists of glacial sediments deposited during the Holocene to Pre-Wisconsinan Period (Bleumle 1988, Clayton 1980). The primary deposits that define the study area are collapse/draped transition sediments. The glacial sediment is characterized by hummocky topography that has draped over and partially obliterated the topography existing before the glacial advance. An area of ring-shaped hummocks is located along the west end of the study area. The sediments are described as an unbedded, unsorted mixture of clay, silt, sand, and pebbles with a few cobbles and boulders. The glacial deposits can be as thick as 100 feet.

The bedrock geology of the study area consists of Sentinel Butte Formation from the Tertiary System. The Sentinel Butte Formation consists of gray-brown bentonitic claystone, siltstone, sandstone, and lignite. The sandstone is thin bedded and is generally fine-grained and silty. This formation can be up to 510 feet thick.

No economic coal deposits were identified within the study area as shown in Appendix B. These deposits meet the minimum criteria established by coal companies operating surface mines in North Dakota (Murphy 2007). One economic coal deposits was identified in several areas adjacent to the southwestern corner of the study area. This deposit has not been mined and does not represent an active mining area. HDR recommends that Infinity consult with landowners regarding the presence of economic coal deposits. Conflicts with future coal mining operations could be avoided by placing turbines and other project facilities outside of areas thought to include economic coal deposits.

No recorded areas of seismic activity or subsidence were identified in the study area. However, there are several active or previously mined areas that were identified south of the study area. One gravel pit is located within the study area. Approximately eight gravel pits were identified within 3 miles of the study area and are located primarily to the south (Figure 2).

Groundwater in the region supplies both public and private wells (Croft 1973). Shallow groundwater typically follows local topography and regional groundwater flow is likely directed north and east toward Lake Sakakawea and the Missouri River.

Soil Resources

The study area consists mostly of farmland areas classified as not prime farmland (77 percent). The remaining area is mostly farmland of statewide importance (19 percent). Figure 7 shows the prime farmland and farmland of statewide importance soil classifications. Table 5 shows the acreage of the various soil classifications in the study area.

Table 5. Prime Farmland Soils Project Study Area

Farmland Status	Acres of Study Area	Percentage of Study Area (%)
Prime Farmland	235	1.5
Unclassified	327	2.1
Farmland of Statewide Importance	2,972	19.1
Not Prime Farmland	12,019	77.3
Total	15,555	100.0

Source: NRCS SSURGO Soils Data

2.5 HAZARDOUS MATERIALS

The Environmental Protection Agency (EPA) Superfund National Priorities List (NPL) database was reviewed to determine the potential for major hazardous material issues within the study area. An Environmental Data Resources search was not purchased. However, NDDOT maps were consulted as they often identify known dumps in the area. No NPL sites are present within Stark and Morton counties (U.S. EPA CERCLIS 2009).

There are no hazardous waste handlers or toxic release inventory sites located within the study area or within 5 miles of the study area (National Atlas 2009).

HDR recommends that a Phase I Environmental Site Assessment (ESA) be conducted on all leased properties within the study area in order to properly locate and avoid hazardous and/or potentially hazardous sites. A current Phase I ESA is often requested by an insurance provider or financier of a project in order to identify potential or existing environmental contamination liabilities.

2.6 SURFACE WATER AND FLOODPLAIN RESOURCES

Wetlands and Watercourses

As shown in Figure 8, there are intermittent streams and wetlands throughout the study area. Most are intermittent in nature, and in many cases, function as drainageways within tilled agricultural fields. More information on wetlands is found in Section 2.7.

Floodplains

The study area is located in an area of Stark and Morton counties that has not been mapped by the Federal Emergency Management Agency (FEMA). Flood Insurance Rate Maps (FIRM) are not available.

2.7 BIOLOGICAL RESOURCES

Wetlands

Wetlands within the study area are scattered and relatively sparse as evidenced by NWI data. Table 6 provides the acres of NWI wetlands present in the study area. Seasonal wetlands are usually surrounded by tilled fields; open water wetlands are occasional, and in many cases associated with streams. Open water wetlands are often surrounded by pasture.

Wetlands in the state of North Dakota are regulated by USACE, whose jurisdiction only includes wetlands connected to a “Water of the U.S.” (i.e. non-isolated). Based on a preliminary review of the project site using aerial photos and USGS maps, many of the freshwater emergent wetlands and freshwater ponds are isolated and will not be jurisdictional under USACE regulations. Impacts to

wetlands that are jurisdictional will fall under Nationwide Permit 12 conditions, provided that the following conditions are met:

- None of the crossings are longer than 500 linear ft and do not run parallel to the stream channel.
- None of the impacts exceed 1/10th of an acre.

HDR recommends completing a wetland delineation to identify wetlands in the project area and their jurisdictional status. A delineation will also provide information to project developers to help avoid wetlands where possible and meet Nationwide Permit conditions if impacts occur. Previous wind projects in this part of North Dakota have been able to avoid jurisdictional wetlands completely, with turbine foundations, access roads and other facility components that require permanent impacts. Temporary impacts from buried underground cabling have often been required, but the 500 foot crossing distance allows sufficient distance to cross the types of wetlands that are present in the study area. As a result, permitting through USACE has not typically posed a challenge.

Table 6. NWI Wetlands in the Study Area

Type of Wetland	Acres of Wetland	Percentage of Study Area (%)
Freshwater Emergent Wetland	21.6	<1.0
Freshwater Pond	37.6	<1.0
Freshwater Forested/Shrub Wetland	0.8	<1.0
Other	2.0	<1.0
Total	62.0	<0.4

Vegetation

Agriculture is the predominant land use in the study area; crops are generally small grains and corn. North Dakota has listed twelve species which are considered noxious weeds (North Dakota Century Code chapter 63-01.1). Stark and Morton counties have no additional listed noxious weed species (NDDA 2009). None of these species have been inventoried in either county in the North Weed Mapper (State of North Dakota 2009).

Wildlife

The wildlife species likely present within the study area are typical for agricultural landscapes, pasture grasslands, and wetland habitat in the region. They include mammals such as badgers, beavers, ground squirrels, chipmunks, mice, voles, rats, moles, shrews, raccoons, skunks, and bats. Snakes, lizards, frogs, and toads are also found in the area.

Birds in the area include local predatory and grassland birds; however, a wide variety of birds may use the area seasonally during migration. Migrating birds use local ponds and wetlands for stopovers and local birds use the marshland and shrubland habitat for nesting.

Terrestrial wildlife is most common in farm fields, pasture, fencerows, intermittent creeks, and wetland areas. These areas provide corridors for migration and foraging as well as ample cover for small mammals, raptors, waterfowl, upland game birds, and other common wildlife in the area.

A review of the North Dakota Natural Heritage conservation database was not completed for this analysis, but is recommended to identify species of concern or ecosystems considered significant by the state of North Dakota.

Breeding Bird Surveys

There are no documented North American Breeding Bird Surveys Routes (BBS) occurring within the study area. There is one (Glen Ullin, 39,454.1 meters long) BBS documented which ends about 6 miles southeast of the study area. This survey route is shown on Figure 9. Surveys along the route are conducted annually during the peak of the nesting season, usually in May or June. The results of these surveys are used to estimate the number of birds that a very good birder would encounter in about 2.5 hours of birding along the BBS route. Observations along the Glen Ullin Route have identified 116 species of birds (Sauer and others 2008).

The 10 most frequently recorded BBS species along each route are listed in Table 7.

Table 7. Ten Most Frequently Recorded Species in BBS (Glen Ullin)

Bird Estimate*	Common Name	Scientific Name
195.13	Lark Bunting	<i>Chondestes melanocorys</i>
193.73	Western Meadowlark	<i>Sturnella neglecta</i>
134.13	Horned Lark	<i>Eremophila alpestris</i>
113.47	Brown-headed Cowbird	<i>Molothrus ater</i>
110.87	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
102.73	Ring-necked Pheasant	<i>Phasianus colchicus</i>
84.87	Mourning Dove	<i>Zenaida macroura</i>
65.53	Chestnut-col. Longspur	<i>Calcarius ornatus</i>
47.53	Common Grackle	<i>Quiscalus quiscula</i>
40.07	Bank Swallow	<i>Riparia riparia</i>

* The number of birds that a very good birder would encounter in about 2.5 hours of birding along the BBS route.

The lark bunting is considered a North Dakota Species of Conservation Priority (SoCP). See Appendix C for a full list of species recorded in the Glen Ullin BBS.

Migratory birds, including many of the species documented in the BBS, are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712). The MBTA is distinct from the Endangered Species Act (ESA) (16 U.S.C. 1531-1544) because it protects migratory bird species that are not necessarily threatened or endangered. See the discussion above about potential migrating bird habitat in and near the study area.

More detailed habitat assessments and/or targeted surveys of the study area might need to be conducted prior to construction to evaluate potential impacts to bird and bat species from the proposed project. HDR recommends that Infinity contact the USFWS, NDGFD, and the North Dakota Parks and Recreation Department (which oversees the North Dakota Natural Heritage conservation database) to discuss the need for siting surveys and preconstruction plans.

Federal and State Listed Species

Section 7 of the ESA requires that all federal agencies consider and avoid, if possible, adverse impacts to federally listed threatened or endangered species or their critical habitats, which may result from their direct, regulatory, or funding actions. The USFWS is responsible for compiling and maintaining the federal list of threatened and endangered species. Section 9 of the ESA also prohibits the taking of any federally listed species by any person without prior authorization. The term “taking” is broadly defined at the federal level and explicitly extends to any habitat modifications that may significantly impair the

ability of that species to feed, reproduce, or otherwise survive. While the prohibition of “taking” federal species applies to anyone, the prohibition of the destruction or adverse modification of designated critical habitat only applies to federal agencies.

The USFWS provides federally threatened and endangered species data at the county level for public use. According to the USFWS, Stark County has two endangered species and one threatened species and Morton County has four endangered species and one threatened species (Table 8, USFWS 2010).

Designated Critical Habitat for piping plover is located in Lake Audubon, Lake Sakakawea, and the Missouri River. These bodies of water are outside of the study area.

Table 8. Federally Listed Threatened and Endangered Species in Stark and Morton Counties

Common Name	Latin Name	County	Habitat	Status
Black-footed Ferret	<i>Mustela nigripes</i>	Stark, Morton	Prairie dog complexes	Endangered
Gray Wolf	<i>Canis lupus</i>	Stark, Morton	Frequently observed in Turtle Mountains	Endangered
Interior Least Tern	<i>Sternula antillarum</i>	Morton	Missouri River and Yellowstone sandbars; beaches;	Endangered
Piping Plover**	<i>Charadrius melodus</i>	Stark, Morton	Missouri River sandbars, alkali beaches	Threatened
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Morton	Bottom dwelling, Missouri and Yellowstone Rivers	Endangered

** Designated Critical Habitat for piping plover is located on the following water bodies: Lake Audubon, Lake Sakakawea, and the Missouri River. All of these water bodies are located north and east of the study area.

Black-footed ferret—Historically, black-footed ferrets occupied much of the Great Plains region of North America, colocating with prairie dog (*Cynomys* sp.) colonies and complexes. Black-footed ferrets depend on prairie dog complexes for food and habitat. Prairie dogs and black footed ferrets prefer level topography in grasslands, steppe, and shrub steppe. Plowed lands, forests, wetlands, and water are avoided (USFWS 1988). There are no records of recent black-footed ferret occurrences in North Dakota but there is potential for reintroduction (USFWS 2008b).

Gray wolf—The gray wolf was historically found throughout North America, with the exception of parts of the southwest and southeast United States. There have been documented occurrences of gray wolves in North Dakota during the 1990s. The presence of wolves in most of North Dakota would likely remain sporadic and consist of occasional dispersing animals from Minnesota and Manitoba (USFWS 2008a). Wolves have most frequently been observed in the Turtle Mountains of North Dakota, approximately 200 miles from the study area (USFWS 2008b).

Interior least tern—The interior least tern is a migratory species that breeds along the Pacific, Atlantic, and Gulf coasts as well as the major interior rivers of North America. Historically the interior population bred along the Mississippi, Missouri, Arkansas, Red, Rio Grande, and Ohio River systems (USFWS 1994). In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea. Approximately 100 pairs breed in North Dakota (USFWS 2008c).

Piping plover—The piping plover breeding range stretches from south central Canada into the Midwest United States. The majority of piping plover breeding pairs found in the United States are concentrated in Montana, the Dakotas, and Nebraska. This population of piping plover winters in the Gulf of Mexico. In

North Dakota, the piping plover nests on midstream sandbars along the Missouri and Yellowstone Rivers and along shorelines of saline wetlands. More piping plovers nest in North Dakota than any other state (USFWS 2008b). There is no USFWS-designated critical habitat for the piping plover in the study area (50 CFR Part 17). The closest critical habitat is located along Lake Sakakawea approximately 45 miles north of the study area.

USFWS has been taking a very cautious approach to energy projects within the migratory corridor and they should be consulted to discuss potential impacts and probable avoidance or mitigation strategies.

Pallid Sturgeon—The pallid sturgeon's native habitat in the Mississippi and Missouri Rivers and their tributaries includes large river ecosystems with high turbidity, free flow, and warm water, according to the Pallid Sturgeon Recovery Plan (USFWS 1993). There is no habitat in the study area.

Whooping Crane—Historic nesting ranges for the whooping crane are thought to have extended throughout the northern Great Plains (USFWS 2007a). The Aransas-Wood Buffalo population of whooping cranes winters in the Aransas National Wildlife Refuge on the Texas Gulf Coast, and then migrates across the Great Plains to breed in the summer in the Wood Buffalo National Park in Northwest Territories, Canada. This population contained 236 individuals in October 2007 (Stehn and Wassenich 2008), and is the only self-sustaining, wild population (USFWS 2007b). The study area is within the 200-mile wide migratory corridor (Figure 9). The migration corridor was identified based on sightings since 1975 (USFWS 2007).

No sightings have been documented in the study area, and the nearest confirmed sighting is 14 miles east-northeast of the project area. Wetland maps and aerial photos indicate that there are very few areas within the study area that would provide habitat for whooping cranes during migration. The lack of viable habitat increases the likelihood that the USFWS and NDGFD will view wind development within the study area positively.

USFWS has been taking a very cautious approach to energy projects within the migratory corridor and they should be consulted regarding potential impacts and probable avoidance or mitigation strategies. Based on guidance provided in an April 2009 issues paper (USFWS 2009), the USFWS is recommending the following for wind projects located within the whooping crane migratory corridor (such as the Sunflower Wind Project):

- Provide compensatory mitigation for every acre of habitat lost to the construction of wind turbines.
- Mitigate or provide conservation offsets for every acre of suitable wetland habitat within 0.5 mile of turbines.
- Maximize placement of collector or transmission lines underground
- Mark project aboveground collector or transmission lines with bird flight diverters.
- Mark existing aboveground transmission lines with bird flight diverters (equal length to the new aboveground lines associated with the project).

Currently, a group of wind energy developers (coordinated by American Wind Energy Association) is in the process of developing a region-wide Habitat Conservation Plan (HCP) for the whooping crane. At this time it is unclear what recommendations for wind turbine siting will be included in the HCP or how the HCP will apply to wind developers who were not part of the HCP process. However, it is likely that the release of the draft HCP (currently scheduled for late 2010) will change USFWS's approach to wind energy development in the whooping crane migratory corridor. At this time, we anticipate that the recommendations included above will still likely be included to some degree in the region-wide HCP.

Species of Conservation Priority—NDGFD has identified 100 SoCP across the state in its Wildlife Action Plan (Hagen et al. 2005). These species are considered important for conservation in the State of North Dakota but do not have any legal protection. The NDGFD has further refined its 100 SoCP into three categories, Levels I-III, with Level I species being of the greatest concern. Thirty-four SoCP species have been identified in the Missouri Slope geographic region, including thirteen Level I species, twelve Level II species, and nine Level III species. Table 9 shows Level I species that have been documented in Stark and Morton counties.

Table 9. Species of Conservation Priority in the Missouri Slope Region

Common Name	Scientific Name	Habitat Type	Habitat Details
Swainson's Hawk	<i>Buteo swainsoni</i>	Native Prairie/ Grassland/Forests	Require native prairie or cropland that includes thickets of natural tree growth, brush margins of native forested tracts, or shelterbelts and tree claims.
Ferruginous Hawk	<i>Buteo regalis</i>	Native Prairie	Confined to very limited areas of native prairie, usually those with hilly terrain or with low-grade topsoil that has not been altered by the plow or lower quality from overgrazing.
Upland Sandpiper	<i>Bartramia longicauda</i>	Native Prairie/ Grassland	Inhabit mixed-grass prairie, local extensive tracts of wet meadow, grazed tall-grass prairie, tame haylands, CRP fields, and mowed or burned railroad or highway rights-of-way.
Long-billed Curlew	<i>Numerius americanus</i>	Native Prairie/ Grassland	Dry, native grasslands.
Wilson's Phalarope	<i>Phalaropus tricolor</i>	Wetland	Found in swales along ephemeral streams and various types of ponds and lakes that contain expanses of shallow water that are interspersed with, or adjacent to, wet-meadow vegetation.
Sprague's Pipit	<i>Anthus spragueii</i>	Native Prairie	Native medium to intermediate height prairie. In short grass prairie landscape, can often be found in areas with taller grasses. More abundant in native prairie than in exotic vegetation. Requires relatively large areas of appropriate habitat.
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	Native Prairie	Open prairies with intermittent brush, avoids heavy brush cover.
Baird's Sparrow	<i>Ammodramus bairdii</i>	Native Prairie /Grassland	Native prairie; structure may be more important than plant species composition. Nesting may take place in tame grasses (found in Crested Wheat, while avoids Smooth Brome). Areas with little to no grazing activity are required.
Lark Bunting	<i>Calamospiza melanocorys</i>	Native Prairie/ Grassland	Short-grass & mixed-grass communities as well as fallow fields, roadsides, and hayfields.
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	Native Prairie/ Grassland	Located in tracts of heavily grazed or hayed mixed-grass prairie or mixed-grass/short-grass prairie.

Common Name	Scientific Name	Habitat Type	Habitat Details
Plains Spadefoot	<i>Spea bombifrons</i>	Native Prairie/ Grassland/Cropland	Found in the dry prairies, sagebrush communities, and farm fields.
Western Hognose Snake	<i>Heterodon nasicus</i>	Native Prairie	Prefers sandy or gravelly habitats like sand prairies, very open portions of prairies, or sand dunes with very little cover.
Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	Native Prairie/ Grassland	Require short-grass prairie habitats. They avoid heavy brush and tall grass areas due to the reduced visibility these habitats impose.

Source: North Dakota Action Plan

Recommendations

Per USFWS Wind Turbine Guidelines Advisory Committee's recommendations², this report provides the preliminary information necessary for a Tier II wildlife analysis. However, to complete a Tier II analysis per the recommendations, a qualified biologist should conduct a site visit to examine the site for wildlife resources and field-check desktop wetland and landcover data. This information will be useful in understanding whether further quantitative and scientifically rigorous studies should be conducted to further assess the potential risk of the proposed project to wildlife (a Tier III analysis). Additionally, the USFWS in North Dakota has historically looked favorably on wind developers that have developed Avian and Bat Protection Plans.

2.8 STATE & LOCAL PERMITTING

The state of North Dakota currently requires a Certificate of Site Compatibility (N.D.C.C. Ch. 49-22) for any wind energy facility larger than 60 MW which is issued by the North Dakota Public Service Commission (NDPSC). Projects smaller than 60 MW are covered under county regulations, if they exist. Many counties in North Dakota have recently adopted, or are considering, ordinances specific to wind energy facility siting. Morton County has adopted a wind energy facility provision. Stark County is considering an ordinance governing wind energy facilities, but has not yet taken action to adopt one. NDPSC has typically asked wind developers to honor county ordinances when completing the site compatibility application process. Most counties also require conditional or special use permits to build wind energy facilities within county boundaries, but these permit applications often include information already generated for the state site compatibility application. Timelines for permit applications vary, but are typically 6-9 months for the NDPSC site compatibility process and 3-6 months for the county conditional/special use permit process.

Both the NDPSC and Morton County have setback requirements for wind turbines. A list of setbacks is shown in Table 10.

² http://www.fws.gov/habitatconservation/windpower/Wind_Turbine_Guidelines_Advisory_Committee_Recommendations_Secretary.pdf

Table 10. State and Local Setback Requirements for Wind Turbines

Setback Feature	NDPSC Voluntary Requirement	Morton County Requirement
Structures	1,500 feet from occupied residence	1,320 or 1.25 times height (whichever is greater) from occupied dwelling, commercial or publicly used structure or building, state or county park.
Public Roads Overhead Transmission	Turbine height (i.e. fall-down distance)	250 feet
Project boundary		1.5 rotor diameter (RD) (Can be modified with variance from affected property owner.
Non-leased Property	1.5 RD	

HT= Total turbine height, measure from highest point of blade.

RD= Rotor Diameter

2.9 CONCLUSIONS

Through due diligence and proactive project development, the potential critical issues associated with this study area may be minimized or avoided. According to HDR's review, the critical issues associated with this study area include:

- Location of the study area within the federally-listed whooping crane migratory corridor will require consultation with the USFWS but the lack of confirmed sightings near the study area and the minimal wetland habitat in the study area make significant concerns less likely.
- Potential interference with microwave beam paths in study area. HDR recommends a microwave beam path study to identify corridors within the study area that may not be viable for wind turbine installation.
- Potential impacts on undiscovered cultural resources

To minimize or avoid these critical issues and other impacts that may arise, HDR suggests continued coordination and consultation with the USFWS regarding potential wetland and grassland easements, and with NDGFD and North Dakota Parks and Recreation Department regarding impacts to the sensitive species listed in Table 8 and Table 9, as well as other species of birds and bats potentially occurring in the area. HDR additionally recommends that Infinity consider preparing and implementing an Avian and Bat Protection Plan for use during construction and operation of the project.

The initial agency response from the USFWS did not include any site specific information. The initial agency response from the NDGF included requests for wetland avoidance and routine monitoring for avian and bat mortality, but did not mention any site specific issues for the Sunflower study area. Complete response letters are included in Appendix D.

HDR recommends that Infinity consider the Wind Turbine Guidelines Advisory Committee recommendations to the USFWS (March 4, 2010) to protect wildlife resources while siting and developing a wind project at this site. This would include consulting with the USFWS and the NDGFD and completing a more detailed Tier II site characterization study. If appropriate, more detailed habitat assessments and/or targeted surveys (Tier III field studies) might also be conducted prior to construction to better predict wildlife impacts and identify potential mitigation options. If combined with post construction monitoring, these studies and surveys will improve the industry's understanding of how

select species may be impacted by wind energy development. For this project in particular, potential field studies requested by agencies appear in Table 11.

Table 11– Potential Field Studies and Anticipated Timelines

Field Study	Duration	Lead Time before PSC Application
Bat Surveys	9-12 months (spring-fall)	12-15 months
Avian Point County Surveys	9-12 months (spring and fall)	12-15 months
Endangered and Threatened Species Habitat Assessments (Tier II Field Studies)	1 month	2-3 months prior to avian/bat surveys
Wetland Delineations	1 month (during growing season)	6 months
Phase I Environmental Site Assessment	1 month	3 months
Cultural Resource Literature Review	1 month	3 months prior to Cultural Resource Field Surveys
Cultural Resource Field Surveys	2-3 months	6 months

Off-site noise modeling for wind projects has typically been included as part of the NDPSC site compatibility process and HDR recommends that a noise study be completed once a turbine layout has been finalized and a NDPSC site compatibility application is being prepared. The 1,500-foot voluntary setback requirement has typically been sufficient to reduce noise levels from wind turbines at the nearest sensitive noise receptors to below recommended levels. The low population of the study area reduces the likelihood that the wind turbine noise will impact area residences and that setback requirements from homes will significantly impact the site layout.

Visual simulations are becoming more common for projects completing the NDPSC site compatibility application, but are not required. HDR recommends a review of the project area to identify any key areas within the project viewshed that may generate visual impact concerns (e.g. public recreation areas, sensitive landowners, etc.). If key areas are encountered, visual simulations of the wind turbine layout from the locations are recommended.

HDR also recommends meeting with Stark and Morton counties and PSC to discuss the project and their permitting expectations prior to submittal of permit applications. Although HDR was unable to confirm the public perception toward wind projects in Stark and Morton counties, obtaining local community support is critical for developers. We recommend that Infinity develop a public involvement plan to maximize public support.

3.0 PERMITS AND APPROVALS

This table provides a summary of the environmental permits that may be required by federal, state, and local permitting agencies, based on HDR's permitting experience with similar projects. Not all of these permits may be required. Conversely, other permits not listed below may be necessary depending on the issues identified as the project is developed.

Regulatory Authority	Statute	Permit/ Approval	Description	Trigger	Fee	Application Timeline	Website
Federal Approvals							
FAA	49 USC 44718	Notice of Proposed Construction (Form 7461-1) Hazard Determination Notice of Actual Construction or Alteration (Form 7461-2)	Notifies FAA of proposed structures that might affect navigable airspace. Form requires proposed markings and lighting. FAA must review possible impacts to air safety and navigation, as well as the potential for adverse effects on radar systems.	All turbines/structures more than 200 feet tall; and/or turbines/structures less than 200 feet tall near an airport.	No fee.	One week to prepare application; submit notice at least 30 days prior to anticipated start of construction and after construction has been completed.	http://www.faa.gov/
USACE	Clean Water Act	Section 404 Permit	Required for the discharge of dredged or fill material into waters of U.S. Minimal levels of fill may be covered under existing General Permits/Letters of Permission	Presence of waters of the U.S. that will be impacted by project	No fee.	Depends on level of fill and type of permit required (individual vs. nationwide)	http://www.usace.army.mil/

Regulatory Authority	Statute	Permit/ Approval	Description	Trigger	Fee	Application Timeline	Website
US Fish and Wildlife – Region Six	Section 7/9 /10 of Endangered Species Act (ESA)	Consultation pursuant to Section 7 or 10 of the Endangered Species Act - USFWS and project proponent (or federal agency) to coordinate on how to implement proposed project while avoiding impacts to federally-listed endangered species to the greatest extent feasible.	Determination that "take" is likely to occur during a proposed non-Federal activity and a decision by the landowner or project proponent to apply for an incidental take permit. Federal activities and non-Federal activities that receive Federal funding or require a Federal permit (other than a section 10 permit) typically obtain incidental take authority through the consultation process under section 7 of the ESA. Thus, the Habitat Conservation Plan (HCP) process is designed to address non-Federal land or water use or development activities that do not involve a Federal action that is subject to section 7 consultation.	Presence of endangered species near the study area and project potentially impacting the endangered species. If a federal permit or approval is required, Section 7 Consultation will be necessary.	No Fee	Prior to ground disturbing activities. Depending on project size and potential impacts to listed species – 1 to 6 months.	http://www.fws.gov/endangered/hcp/hcpbook.htm http://www.fws.gov/mountain-prairie/endspp/
	Compatibility Analysis for wetland/ grassland easements	USFWS and project proponent and consult on project compatibility and special use permit for special easements.	If turbines are placed in wetland or grassland easements then a compatibility determination by the wetland management district is required.	Placement of turbines in a wetland or grassland easement	No fee	Prior to ground disturbing activities. Depending on the number of easements the time for review could be longer – 1 to 3 months.	

Regulatory Authority	Statute	Permit/ Approval	Description	Trigger	Fee	Application Timeline	Website
U.S. Environmental Protection Agency	40 CFR 112	Spill Prevention and Counter-measure Control Plan	Would be required if any facility associated with the project (O&M or substation) has a tank holding more than 1,320 gallons.	Oil storage of more than 1,320 gallons of oil		A copy of the plan will need to be maintained on file with the owner/operator and reviewed by the certifying engineer every five years.	
State Approvals							
North Dakota Public Service Commission	Pursuant to North Dakota Century Code 49-22	Certificate of Site Compatibility	For facilities with greater than 60 MW nameplate capacity. PSC voluntary setback requirements are listed in Table 10.	Generation of power described in previous column.	Variable based on project size.	180 days prior to construction (minimum).	http://www.psc.state.nd.us/jurisdiction/electricity-laws.html
	Pursuant to North Dakota Century Code 49-22	Certificate of Corridor Compatibility and Route Permit	High voltage transmission line approval. Application for both approvals can be prepared/reviewed concurrently. Requires adherence to exclusionary criteria, avoidance criteria, selection criteria and policy criteria	Transmission line greater than 115 kV.	Variable based on project size.	180 days prior to construction days prior to construction (minimum).	http://www.psc.state.nd.us/jurisdiction/electricity-laws.html
North Dakota Department of Health	Clean Water Act	Section 401 Certification	Verify that project construction would comply with state water quality standards.	A 401 Water Quality Certification required if a Section 404 permit is required	No fee.	Same as a Section 404 Permit.	http://www.ndhealth.gov/WQ/
	National Pollutant Discharge Elimination System Act	General Permit (Construction)	For stormwater discharges from construction activities	Grading of more than 1 acre.	No fee for small construction activities	Permit to be filed prior to construction with a Stormwater Pollution Prevention Plan (SWPPP).	http://www.ndhealth.gov/WQ/Storm/Construction/ConstructionHome.htm

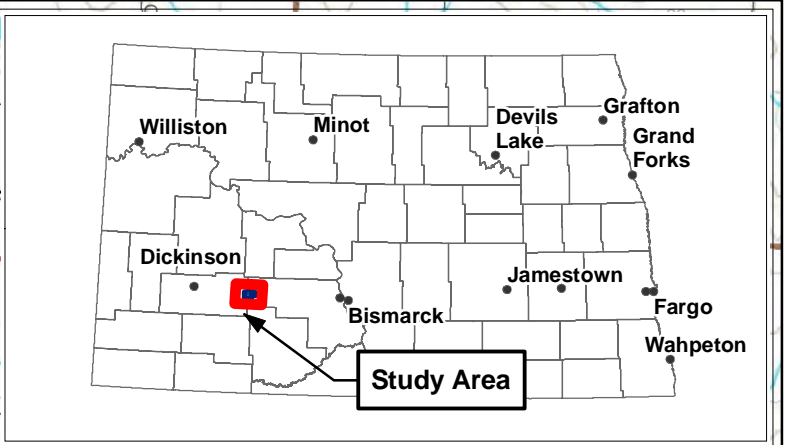
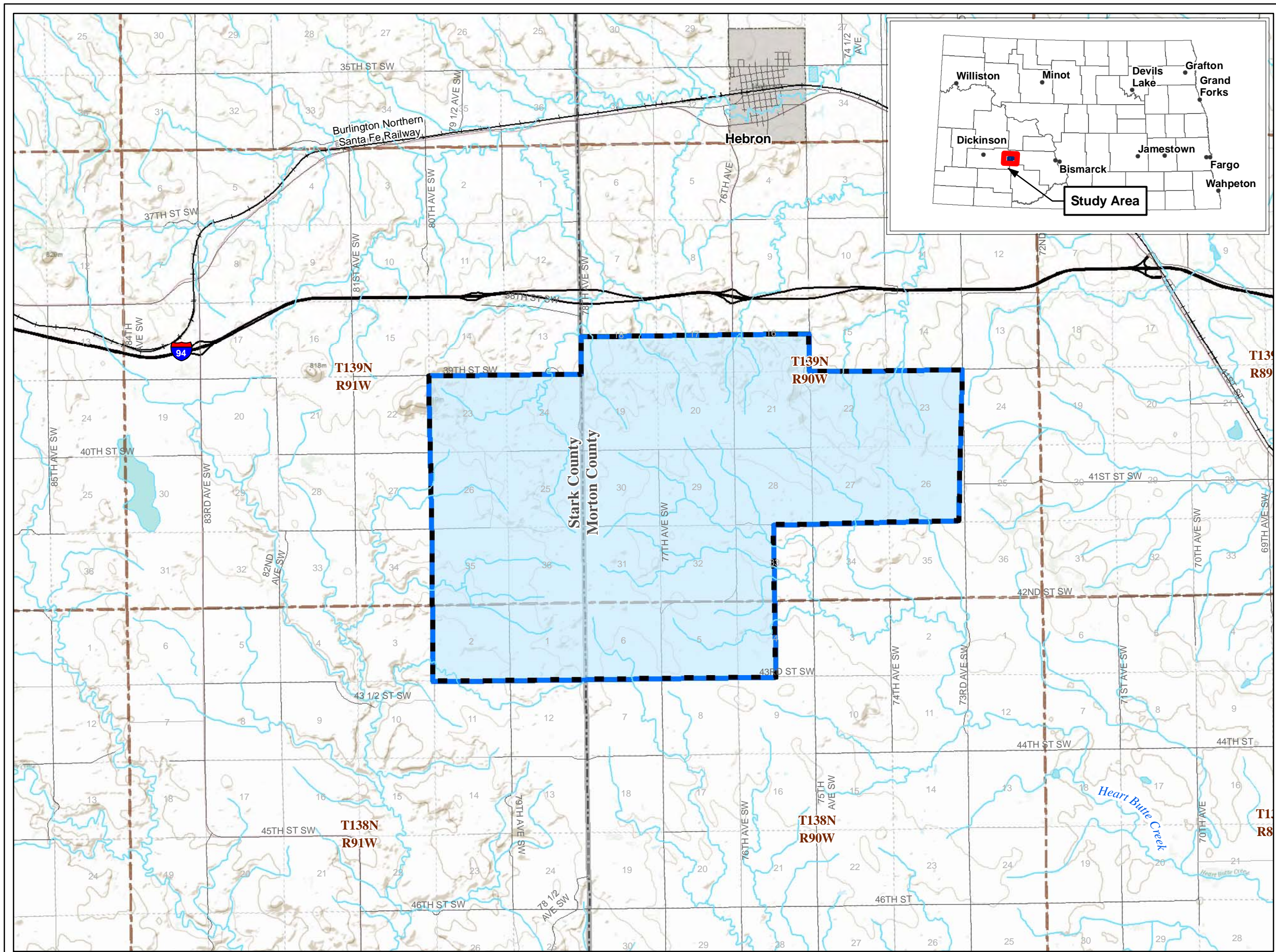
Regulatory Authority	Statute	Permit/ Approval	Description	Trigger	Fee	Application Timeline	Website
		Septic Tank and Drainfield Permit	Required for installation of septic system at O&M facility	Installation of a septic system		Prior to construction	
North Dakota Division of Emergency Services		Emergency Planning and Community Right-to-Know Act (EPCRA) Tier II report	Use of hazardous chemicals/materials.	Generate 220 pounds or more per month hazardous waste	\$413	Submit annually.	http://www.nd.gov/des/uploads/resources/330/tieriiireportinginfopacket.pdf
North Dakota Department of Transportation		Road Approach/ Access Permit	Required to provide driveway access to state owned right of way.	Project requires change in access to or from state right of way or change in use of property.		Prior to construction	
	North Dakota Century Code 24-01	Utility Permit/Risk Management Documents	Required to install utilities within state owned right-of-way	Project requires a utility line crossing of DOT right-of-way	Between \$100-\$200 per crossing	Prior to construction	http://www.dot.nd.gov/divisions/design/utilitypermits.htm
North Dakota Highway Patrol		Overheight/Overweight Permit	Required to transport oversize loads on state maintained roads.	Project construction requires oversize/ overweight truck loads.	Depends on load being carried between \$20 and \$100	Prior to construction	http://www.nd.gov/ndhp/permits/permits.html
State Historic Preservation Office (SHPO) and the Office of the State Archaeologist (OSA)	Pursuant to North Dakota Century Code 55-10; 49-22 and Section 106 Compliance	Review and Coordination	Field reviews for archaeological resources will likely be required by the North Dakota PSC as a condition of the Certificate of Site Compatibility. Section 106 Compliance is required if there is a federal permit or approval	Certificate of Site Compatibility Review by the ND PSC or federal permit/approval.	No Fee	Prior to construction	

Regulatory Authority	Statute	Permit/ Approval	Description	Trigger	Fee	Application Timeline	Website
North Dakota Department of Game and Fish		Wildlife conservation recommendations	Consultation will be required as part of by North Dakota PSC review of the Certificate of Site Compatibility	Certificate of Site Compatibility Review by ND PSC	No Fee		
North Dakota State Water Commission		Temporary Water Permit	Required for temporary use of surface or groundwater	Construction water used onsite		Prior to construction; permit is valid for up to one year	http://www.swc.state.nd.us/4dlink9/4dcgi/GetSubCategoryRecord/Permits/Water%20Permits
Local Regulations							
Stark and Morton County	County Regulations (Morton and Stark)	Conditional Use Permit	All proposed wind energy facilities in an agricultural zone must apply for a conditional use permit with County Planning Commission	Wind energy facility in agricultural zone	Contact County	Prior to construction. Process takes about 3 months.	
	County Regulations- Morton Only	Wind Energy Facilities	Construction requirements (materials used, proximity to buildings, etc). Setbacks are listed in Table 10.	Wind development	N/A	Prior to construction	http://www.co.morton.nd.us/vertical/Sites/%7B90CBB59C-38EA-4D41-861A-81C9D E BD6022%7D/uploads/%7B5A74CC6D-8D37-4C41-B6 76-1AE4A6040CDB%7D. PDF
	County Regulations (Morton and Stark)	Road Crossing/ Encroachment Permit	Required for installation of service connections or extensions of existing underground utilities including crossing of county highways or for placing temporary obstructions on the Right-of-Way.	Working in or utility crossing of county road right-of-way	Contact County	Prior to construction	
	County Regulations (Morton and Stark)	Building Permit	Required if O&M building is constructed	O&M Building	Contact County	Prior to construction	

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Sunflower Wind Project

Figure 1
Study Area Location

Morton and Stark Counties,
North Dakota

- Study Area Boundary
- Local Road
- Unimproved Road
- Highway
- Railroad
- Section Boundary
- Township Boundary
- Municipal Boundary
- County Boundary
- Stream/River

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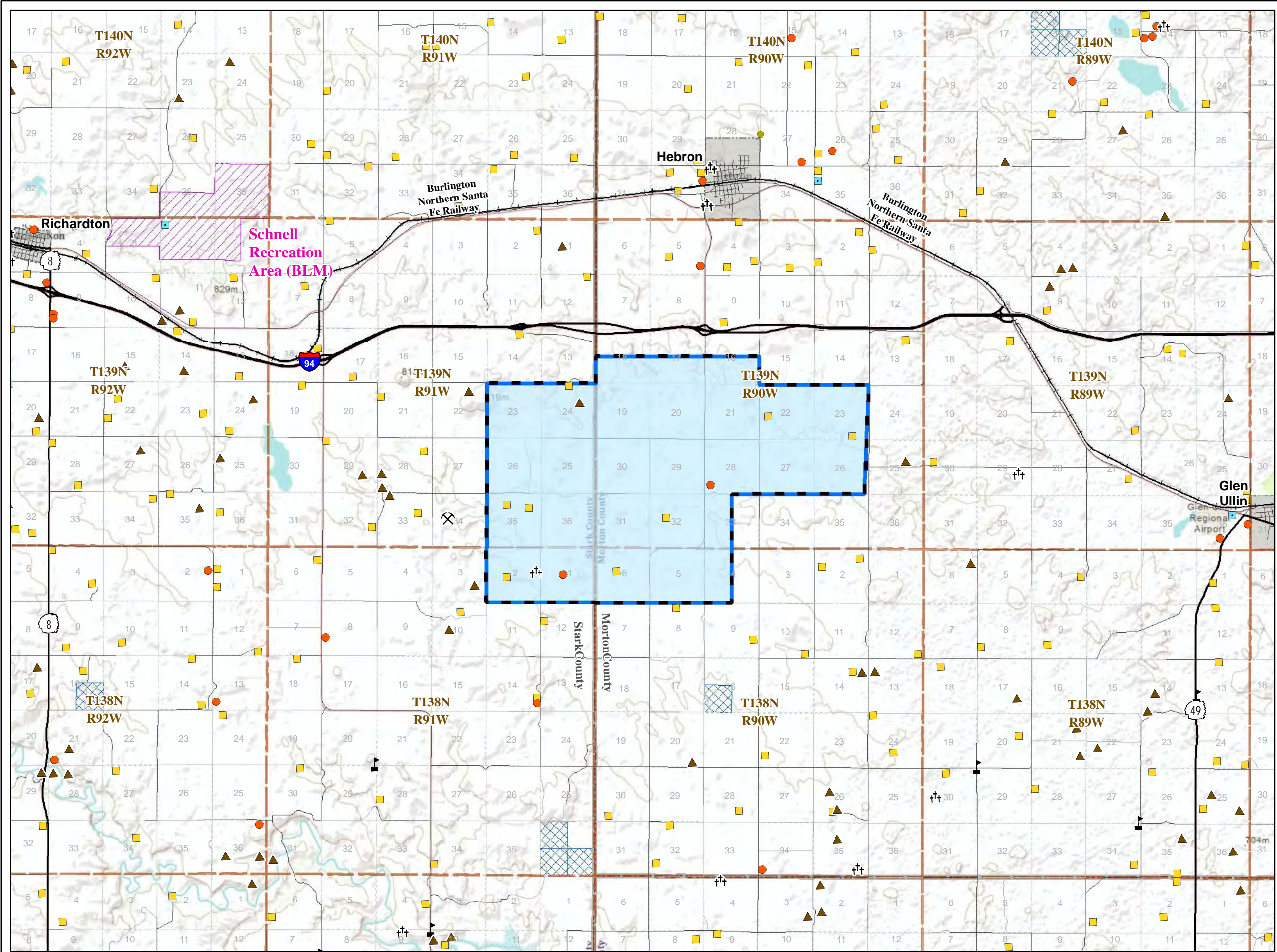
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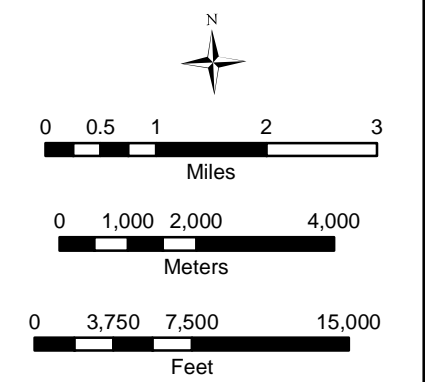


Sunflower Wind Project

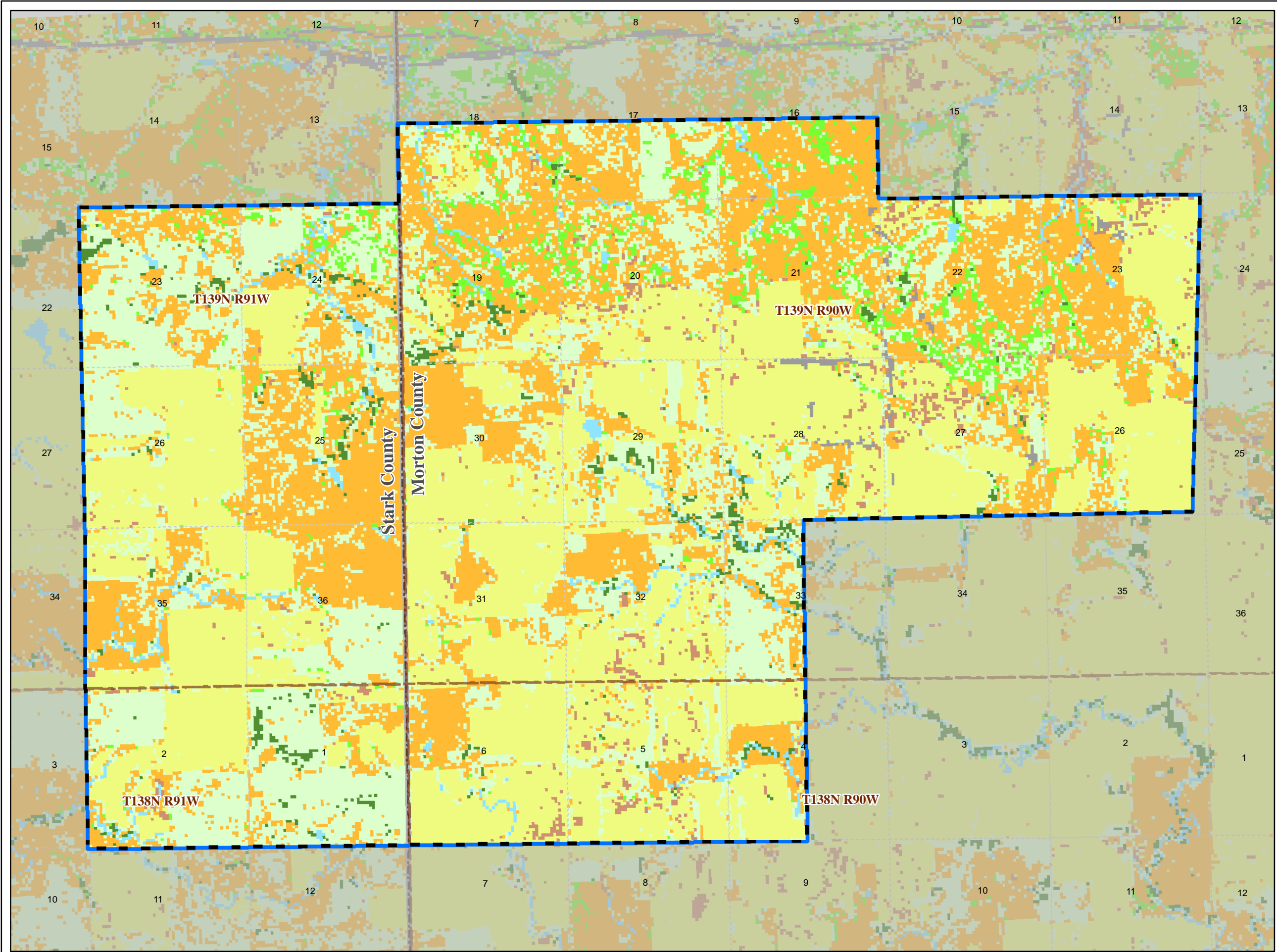
Figure 2
Public Land
& Resource Map

Morton and Stark
Counties,
North Dakota

- Study Area Boundary
- Dwelling other than farm
- Farm Unit
- Recreation
- Dump or Landfill
- Cemetery
- Gravel Pit
- Mine Shaft or Drift
- School
- US Bureau of Land Management
- State Trust Land
- Highway
- Railroad
- Local Road
- Unimproved Road
- Section Boundary
- Township Boundary
- County Boundary
- Municipal Boundary








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



Sunflower Wind Project

Figure 3
Land Cover

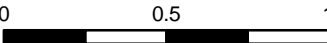
Morton and Stark
Counties,
North Dakota

 Study Area Boundary
 Local Road
 Major Highway
 Railroad
 Section Boundary
 Township Boundary
 County Boundary

Land Cover Type

-  Cropland
-  Developed
-  Planted Herbaceous Perennials
-  Prairie
-  Shrubland
-  Wetland
-  Woodland
-  Barren Land

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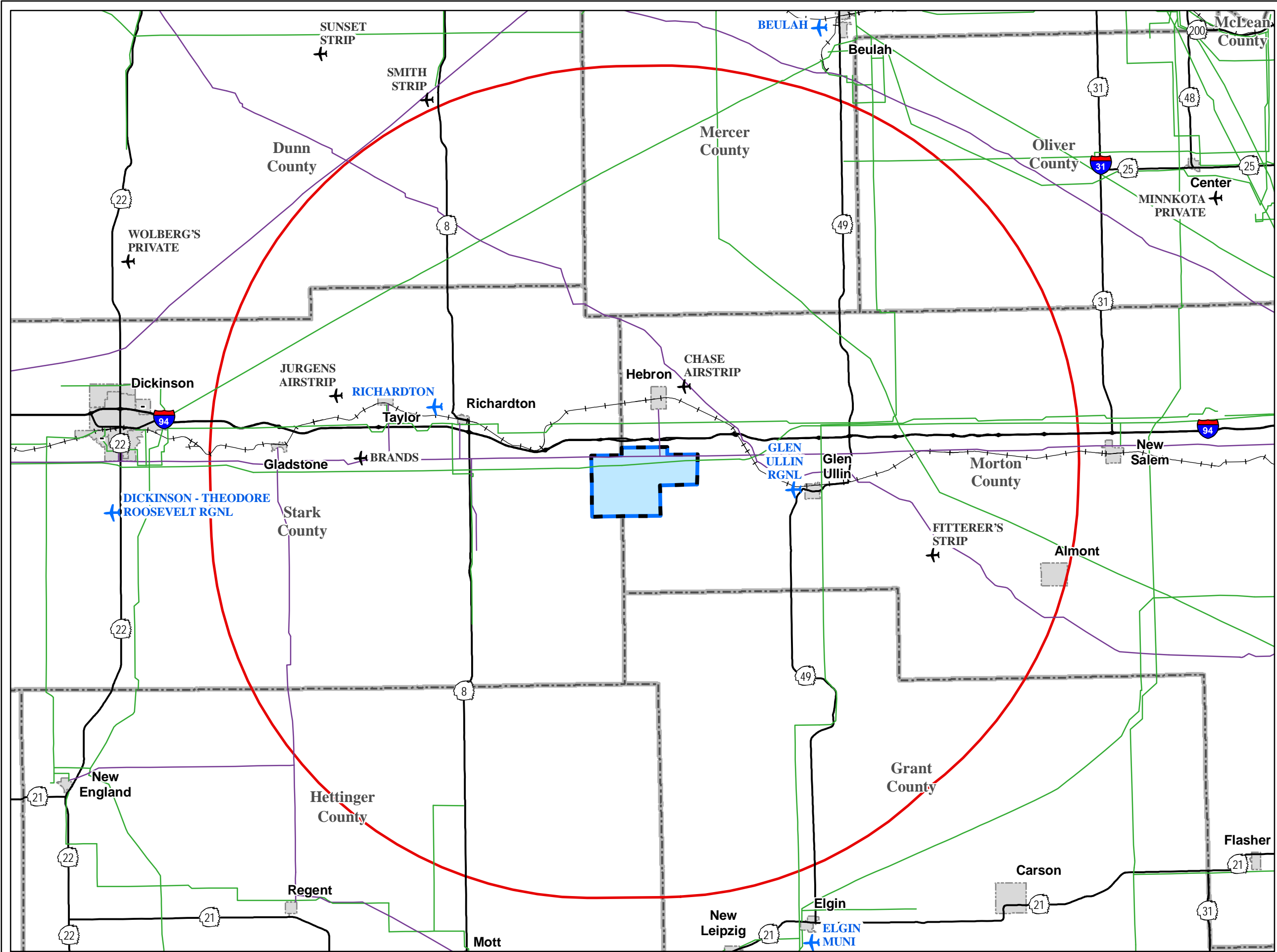
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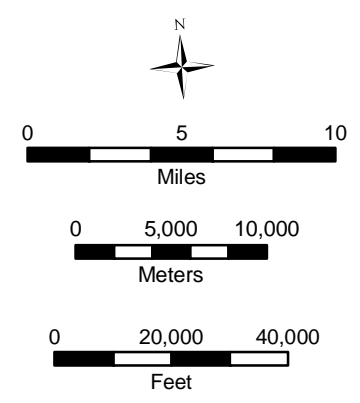
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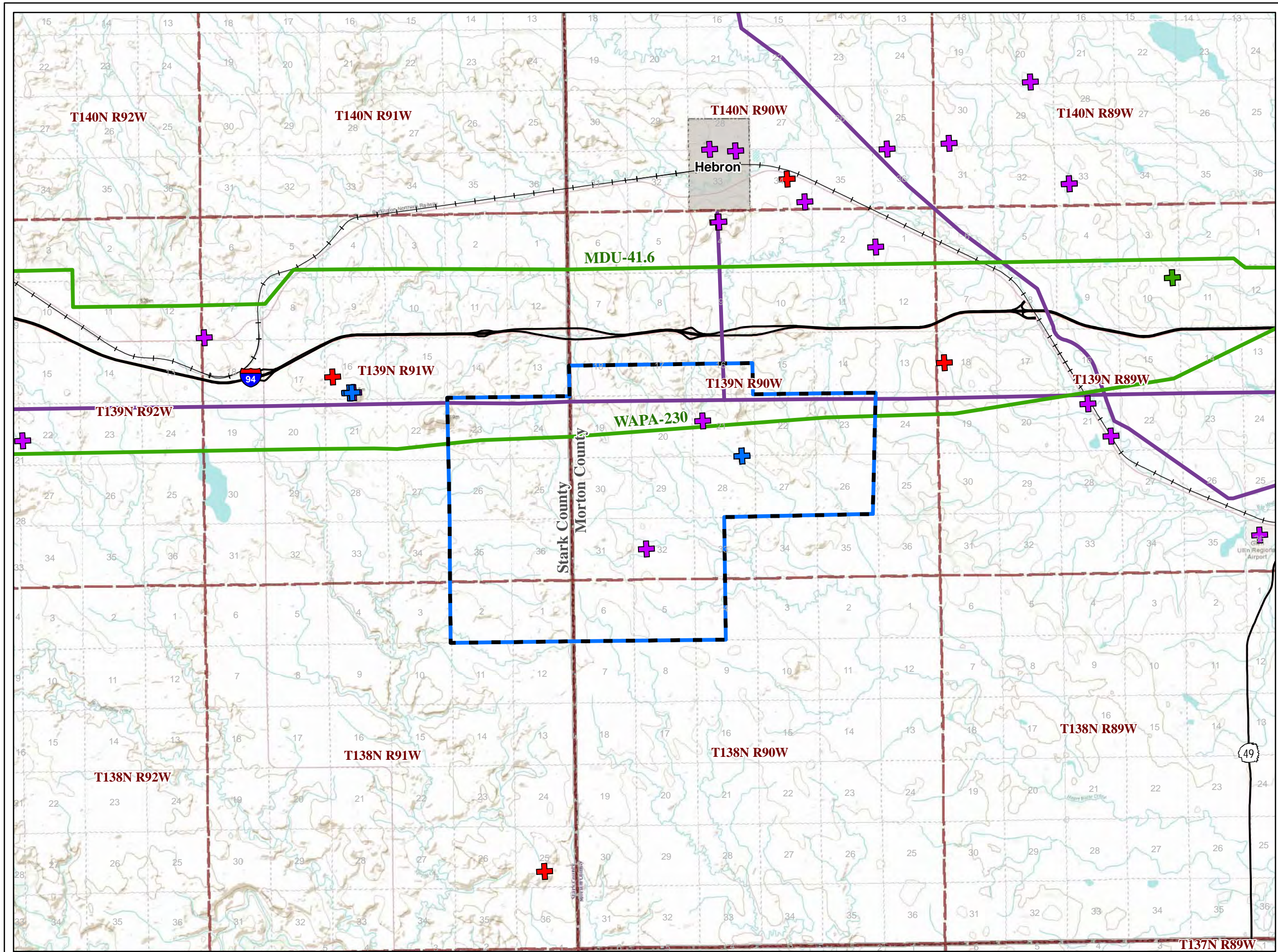


Sunflower Wind Project

Figure 4
Airport and
Utilities Map
Morton and Stark
Counties,
North Dakota

- Study Area Boundary
- 25-mile Radius
- Public Airport
- Private Airport
- Electric Utility
- Gas Utility
- Highway
- Railroad
- Municipal Boundary
- County Boundary



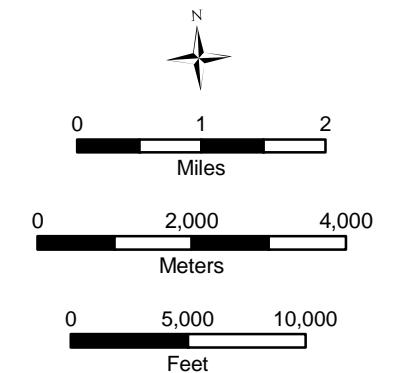


Sunflower Wind Project

Figure 5
FCC and
Utilities Map

Morton and Stark
Counties,
North Dakota

- Microwave Tower
- Land Mobile Tower (Private)
- Land Mobile Tower (Commercial)
- Cellular Tower
- ASR Tower
- Study Area Boundary
- Electric Transmission Lines
- Gas Pipeline
- Highway
- Railroad
- Municipal Boundary
- County Boundary



Sunflower Wind Project

Figure 6
Topography

Morton and Stark
Counties,
North Dakota

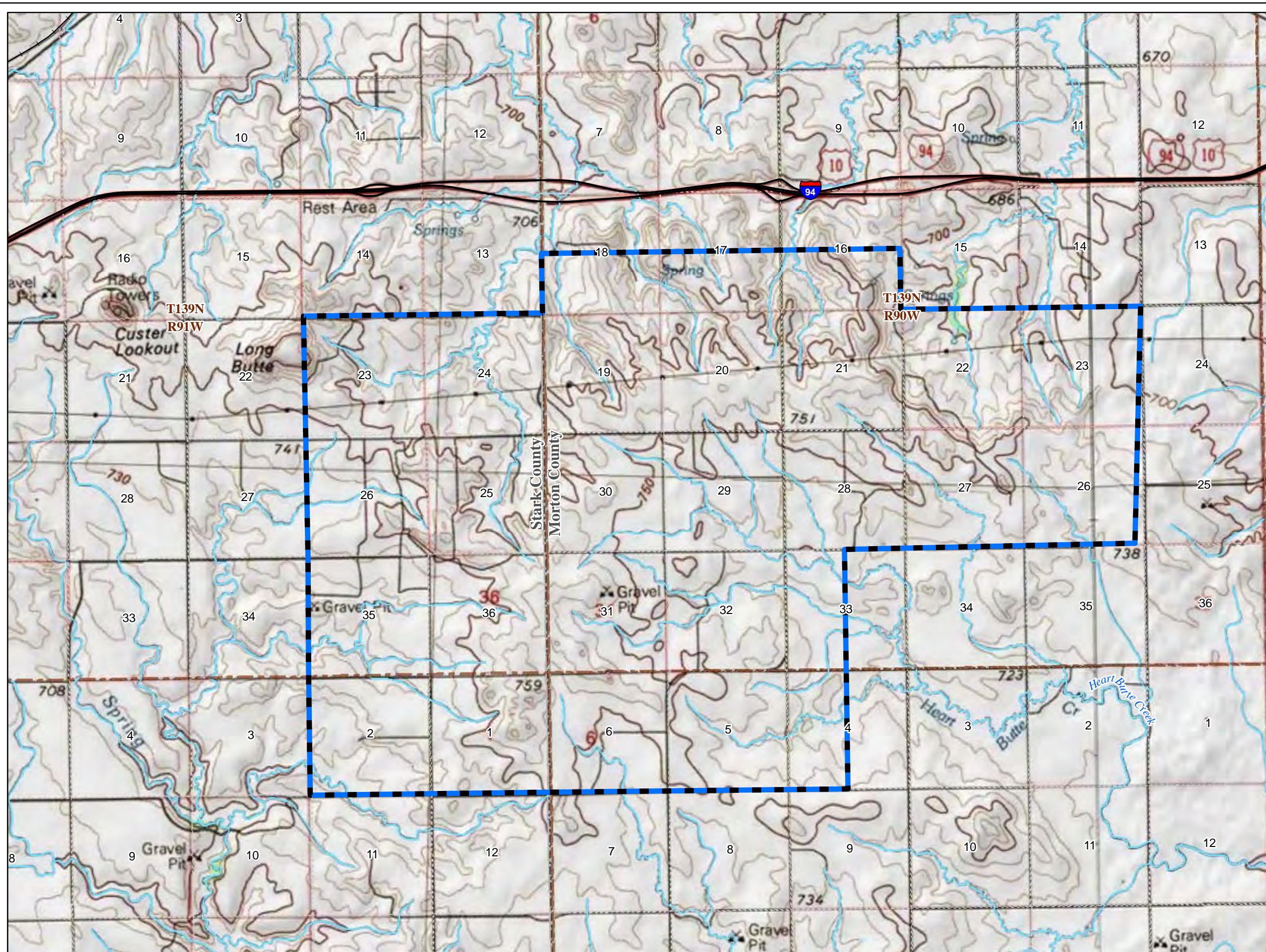
-  Study Area Boundary
-  Highway
-  Railroad
-  Section Boundary
-  Township Boundary
-  Municipal Boundary
-  County Boundary
-  Stream/River



0 0.5 1
Miles

0 1,000 2,000
Meters











0 2,000 4,000
Feet

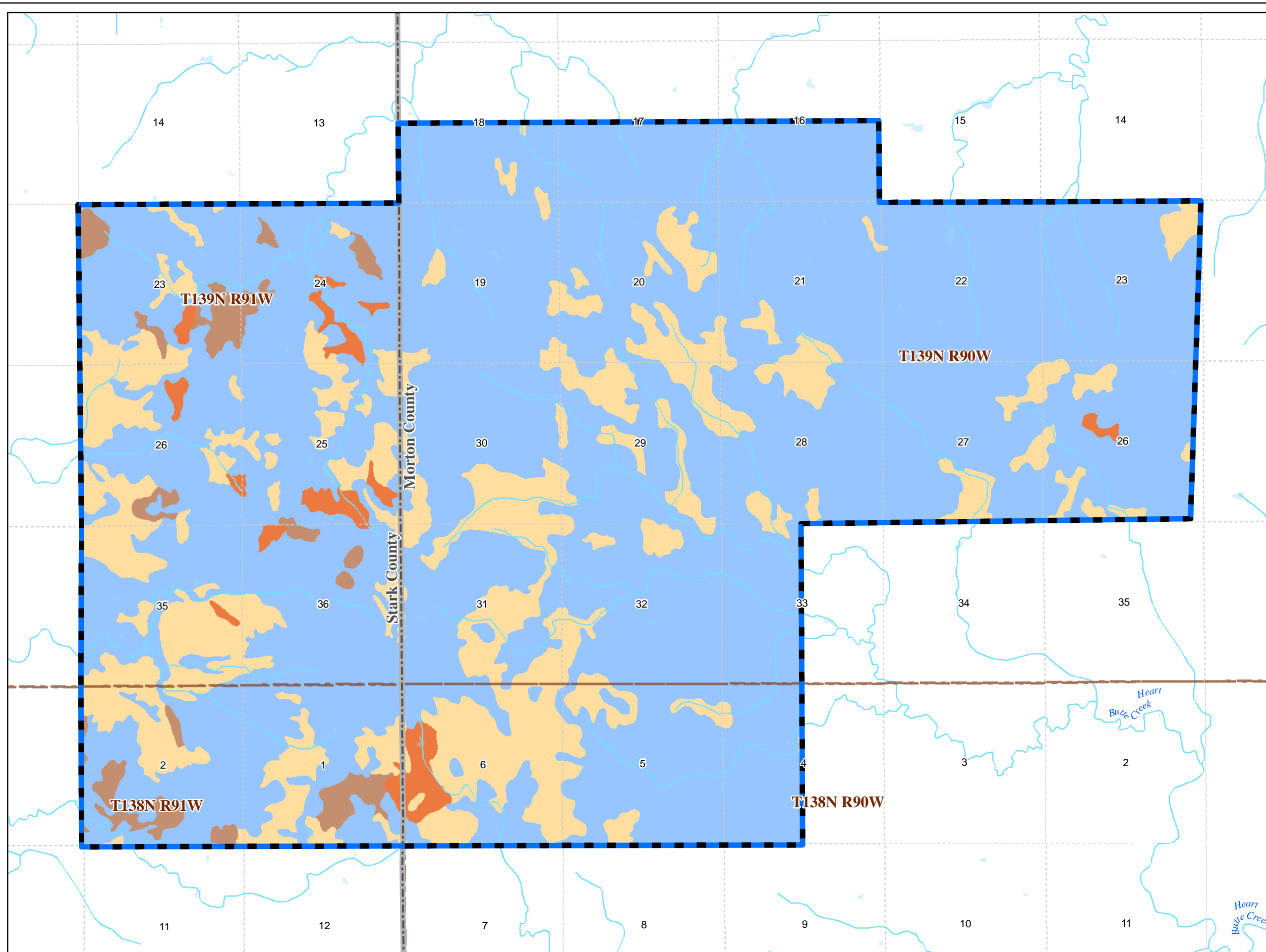
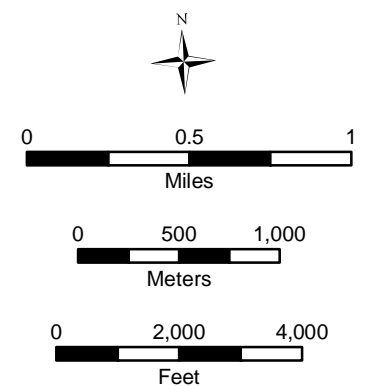


Sunflower Wind Project

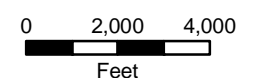
Figure 7
Soils

Morton and Stark
Counties,
North Dakota

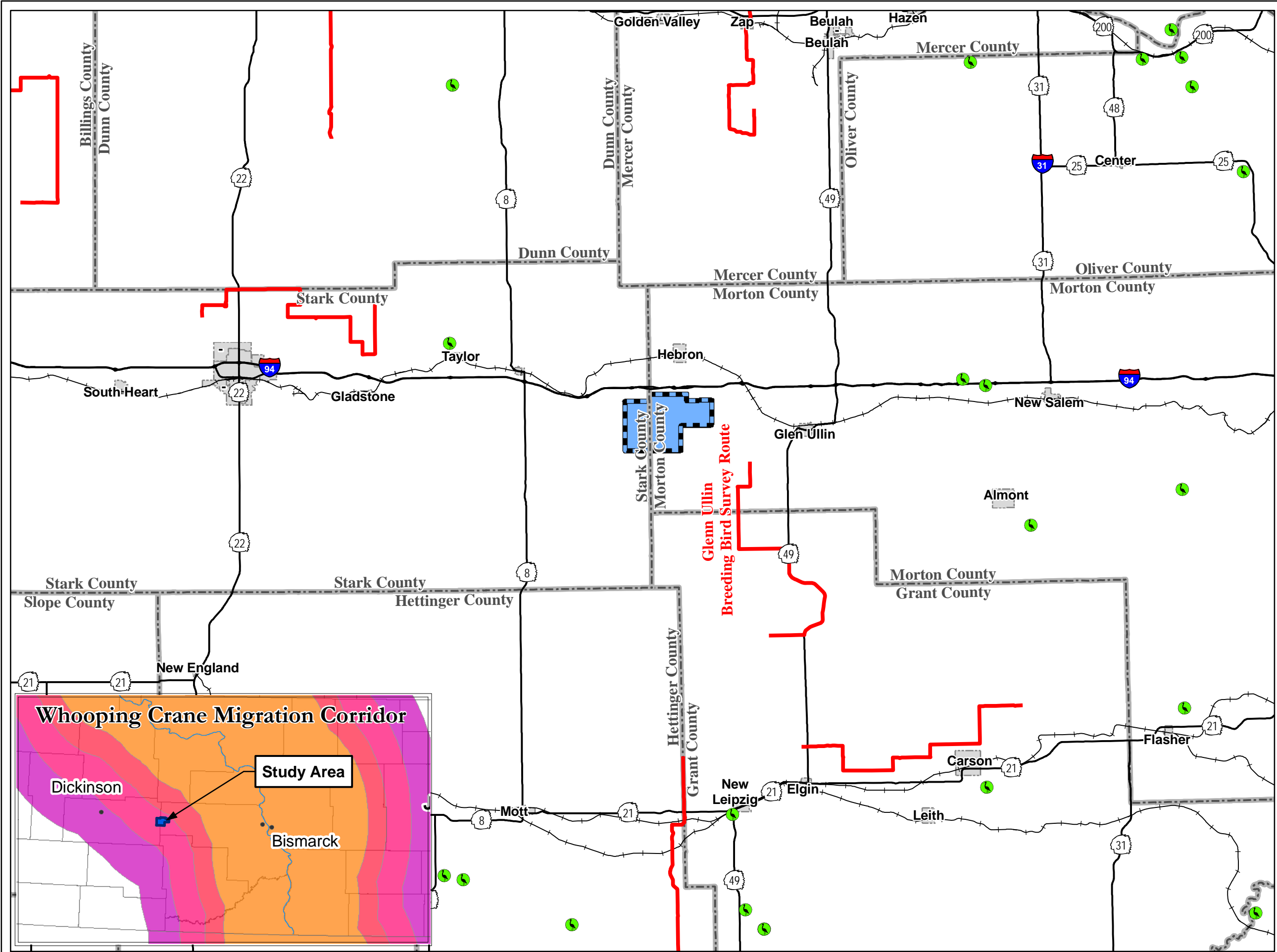
-  Study Area Boundary
- Farmland Classification (SSURGO)**
 -  Farmland of statewide importance
 -  All areas are prime farmland
 -  Not prime farmland
 -  Not Classified
-  Section Boundary
-  Township Boundary
-  Municipal Boundary
-  County Boundary
-  Stream/River



Morton and Stark
Counties,
North Dakota



Map Document: (\\msps-gis-file\GIS\Projects\Infinity\143199\map_docs\mxd\Sunflower\Figure9\WhoopingCrane_new.mxd) 7/30/2010 -- 2:27:18 PM



Sunflower Wind Project

Figure 9 Whooping Crane and Breeding Bird Survey Map

Morton and Stark Counties, North Dakota

Study Area Boundary

Confirmed Whooping Crane Sitings (Through Fall 2007)

Breeding Bird Survey Route

Highway

Railroad

Municipal Boundary

County Boundary

US Migration Corridor

Buffer Miles

	40 mi (75.08%)
	50 mi (79.44%)
	65 mi (85.04%)
	85 mi (89.83%)
	110 mi (94.83%)

0 4 8
Miles

0 7,500 15,000
Meters

0 35,000 70,000
Feet

**Appendix A –
Department of Defense Preliminary Screening Tool Results**



Federal Aviation
Administration

« OE/AAA

DoD Preliminary Screening Tool

Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
 - Air Defense and Homeland Security radars(Long Range Radar)
 - Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
 - Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

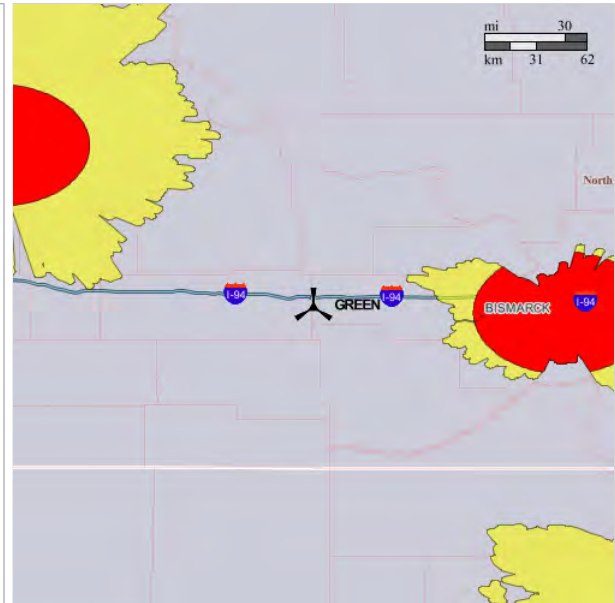
Screening Type: ☒ Long Range Radar ☐ Geometry Type: ☒ Single Point ☐

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	46	49	24.54	N	102	5	6.31	W

Horizontal Datum: ☒ NAD83 ☐

Map Legend:

- Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
- Yellow:** Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
- Red:** Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required.





Federal Aviation
Administration

« OE/AAA

DoD Preliminary Screening Tool

Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
 - Air Defense and Homeland Security radars(Long Range Radar)
 - Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
 - Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: ☐ NEXRAD

Geometry Type: ☒ Single Point

Point Latitude

Deg Min Sec Dir

1

46

49

24.54

N

Longitude

Deg Min Sec Dir

102

5

6.31

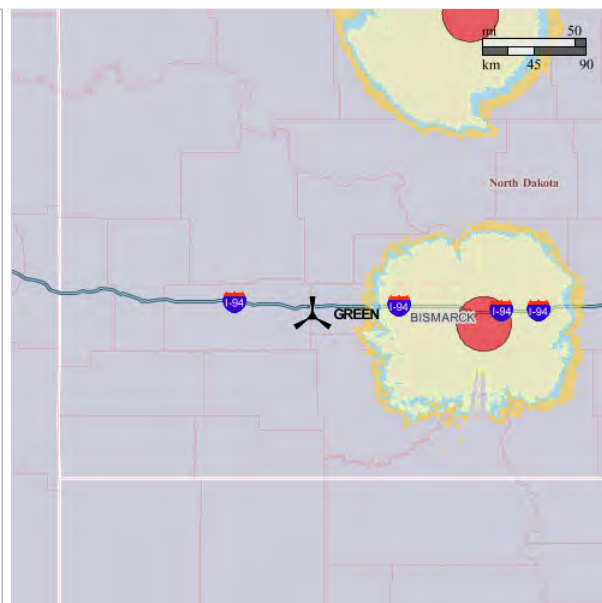
W

Horizontal Datum:

NAD83

Map Legend:

- Green:** Minimal to no impact to Weather Surveillance Radar-1988 Doppler (WSR-88D) weather radar operations. National Telecommunications & Information Administration (NTIA) notification advised.
- Yellow:** RLOS Coverage At or Below 130m AGL. Impact likely to WSR-88D weather radar operations. Turbines likely in radar line of sight. Impact study required. NTIA notification advised.
- Blue:** RLOS Coverage At or Below 160m AGL. Impact likely to WSR-88D weather radar operations. Turbines likely in radar line of sight. Impact study required. NTIA notification advised.
- Gold:** RLOS Coverage At or Below 200m AGL. Impact likely to WSR-88D weather radar operations. Turbines likely in radar line of sight. Impact study required. NTIA notification advised.
- Red:** Impact highly likely to WSR-88D weather radar operations and wind turbine electronics. Turbines likely in radar line of sight. Aeronautical study required. NTIA notification strongly advised.



For more information, or to discuss the screening results, please contact NOAA at wind.energy.matters@noaa.gov



Federal Aviation
Administration

« OE/AAA

DoD Preliminary Screening Tool

Disclaimer:

- The DoD Preliminary Screening Tool enables developers to obtain a preliminary review of potential impacts to Long-Range and Weather Radar(s), Military Training Route(s) and Special Airspace(s) prior to official OE/AAA filing. This tool will produce a map relating the structure to any of the DoD/DHS and NOAA resources listed above. The use of this tool is **100 % optional** and will provide a first level of feedback and single points of contact within the DoD/DHS and NOAA to discuss impacts/mitigation efforts on the military training mission and NEXRAD Weather Radars. **The use of this tool does not in any way replace the official FAA processes/procedures.**

Instructions:

- Select a screening type for your initial evaluation. Currently the system supports pre-screening on:
 - Air Defense and Homeland Security radars(Long Range Radar)
 - Weather Surveillance Radar-1988 Doppler radars(NEXRAD)
 - Military Operations
- Enter either a single point or a polygon and click submit to generate a long range radar analysis map.
- Military Operations is only available for a single point.
- At least three points are required for a polygon, with an optional fourth point.
- The largest polygon allowed has a maximum perimeter of 100 miles.

Screening Type: ☒ Military Operations ☐ Geometry Type: ☒ Single Point ☐

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	46	49	24.54	N	102	5	6.31	W

Horizontal Datum: ☒ NAD83 ☐

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Dr. Thomas (Thom) H. Rennie at the USAF Regional Environmental Coordinator at (214)767-4678 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Anthony M. Parisi, PE at the USN Regional Environmental Coordinator at (805)989-9209 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact LTC Pete Kowal at the USA Regional Environmental Coordinator at (425)227-2955 for confirmation and documentation.

The preliminary review of your proposal does not return any likely impacts to military airspace. Please contact Mr. Pat Christman at the USMC Regional Environmental Coordinator at (760)725-2674 for confirmation and documentation.

This is a preliminary review of your proposal and does not preclude official FAA processes.

Your search data is not retained and the privacy of all your searches is assured.



Any questions interpreting the map, please email Steve Sample with your question/s and phone number at steven.sample@pentagon.af.mil

**Appendix B –
Economic Coal Deposit Maps**

Lignite Reserves Dickinson 100K Sheet, North Dakota



Edward C. Murphy
2005

There are just over one billion tons of economically mineable lignite in North Dakota. The lignite reserves are estimated to be as much as 800 million tons of this reserve may be attributable to the Lignite bed which extends throughout the northwestern corner of this map sheet. The Lignite coal is more than 25 feet thick north of Dickinson (Murphy et al., 2000). JK Ranch (156 million tons), Belknap (201 million tons), West Dickinson (138 million tons), and Black Creek (192 million tons) are the largest deposits in this map sheet (Murphy et al., in press).

The Lignite bed is overlain by the Dickinson bed, both seams were mined in the 1980s and switched to surface mining in the 1990s. The last coal mine to operate in Stark County was the JK Ranch mine which ceased operation in 1999. Great Northern Properties is currently operating a lignite mine and constructing a power plant south of the town of South Heart.

References
Murphy, E.C., Karpus, N.W., and Grooms, G.L., 2000. The major coal and lignite basins of North Dakota. In: *Geological Survey of North Dakota, North Dakota Geological Survey Report of Investigations No. 100*.

Study Area (HDR)
UNIT DESCRIPTIONS

- Geology Undifferentiated
- Area of Mined Lignite
- Economic Coal Deposits

Economic coal deposits are those that meet the minimum criteria established by coal companies operating surface mines in North Dakota. The minimum criteria are: a minimum thickness of 25 feet, a minimum individual bed thickness of at least 2.5 feet, a ratio of 25 feet of overburden, and a maximum depth to coal of approximately 150 feet.

Geologic Symbols
— Extent of Local Lignite Reserves
• Data Points
— Topographic Contours (100-foot intervals)
— 1:4 mile scale, and 1:2 mile scale

- Other Features**
- Water
 - Water - Irrigation
 - Water - Reservoir
 - River/Stream - Perennial
 - River/Stream - Intermittent
 - Swampy Country
 - County Boundary
 - Interstate Highway
 - State Highway
 - Proposed Road
 - Unpopulated Road

Scale 1:100,000
0 1 2 3 4
Miles
Map Scale: 1 inch = 1.6 miles (1:160,000)
North arrow pointing up (0°)
UTM Zone 18N, Datum NAD 83, Spheroid GRS 80, Projection UTM

The North Dakota Geological Survey can publish on demand (24-hour) scale maps. The maps are available for purchase at a cost of \$10.00 per map. The maps are available for purchase at a cost of \$10.00 per map. The maps are available for purchase at a cost of \$10.00 per map.

This product was prepared by the U.S. Geological Survey, Department of Interior, under contract number 0236-00-0017 and 0236-00-0018.



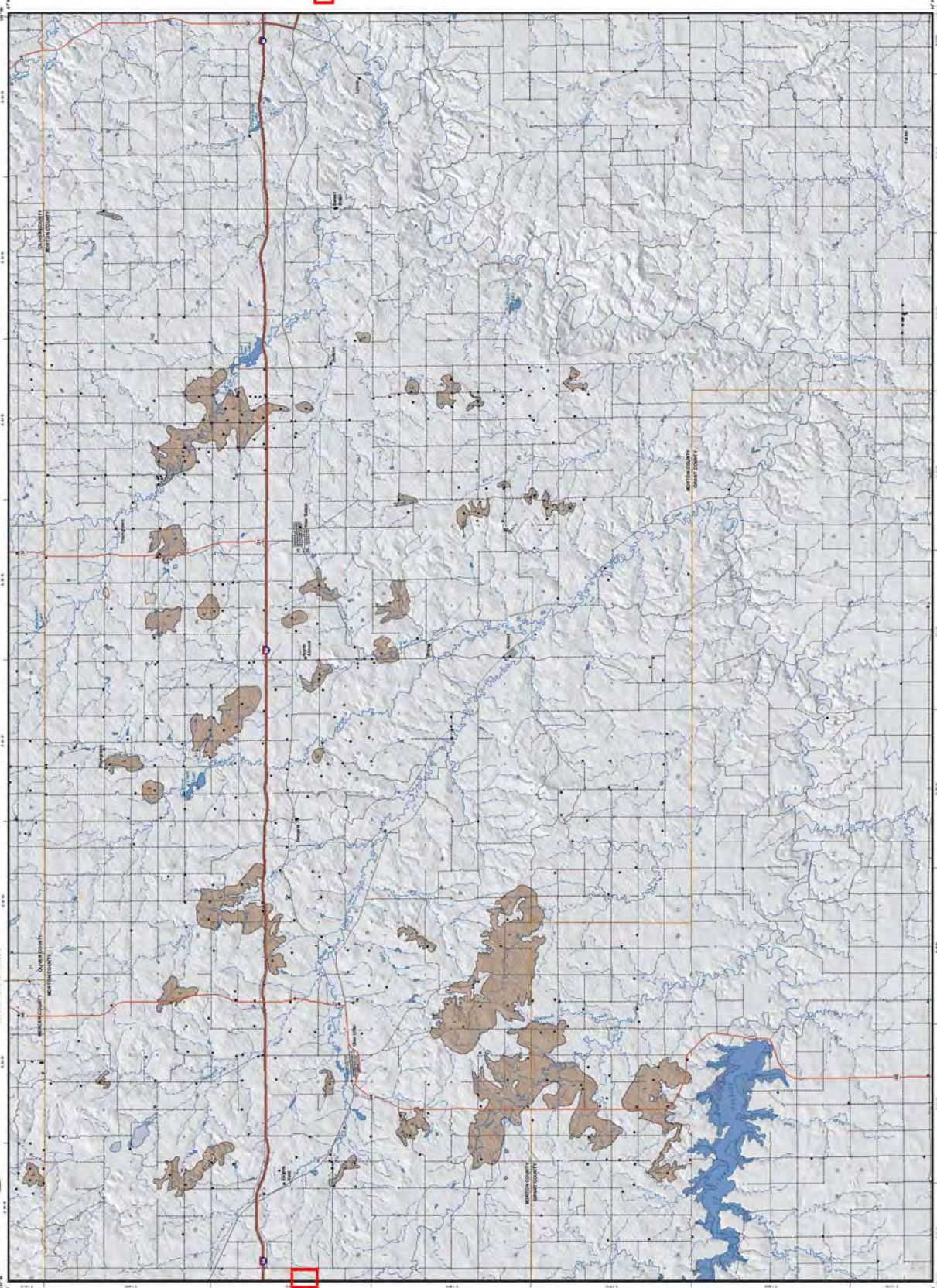
North Dakota Geological Survey
100K Series Color - C



Lignite Reserves Glen Ullin 100K Sheet, North Dakota

Feature	Symbol
Water	Blue
Water - Intermittent	Blue dashed
Water - Seasonal	Blue dotted
Water - Perennial	Blue solid
Water - Artificial	Blue dashed with cross-ticks

Edward C. Murphy, State Geologist
Lynn D. Harris, Director, Dept. of Mineral Resources



Edward C. Murphy
2006

The Glen Ullin 100K sheet contains approximately 726 million tons of economically mineable lignite. The Heart Butte Creek (HBC) is the primary waterway in the area. The map shows the distribution of lignite reserves, with the largest concentrations in the central and southern portions of the sheet. The map also shows the locations of several lignite mines, including the Heart Butte Creek Lignite Mine, the McCook Lignite Mine, and the Sully Lignite Mine.

The Sully Lignite Mine is the largest lignite mine in the area. It is located in the central portion of the sheet, near the Heart Butte Creek. The mine is operated by the Sully Lignite Company. The mine has a capacity of 1.5 million tons per year. The mine is one of the largest lignite mines in the United States.

References:
North Dakota Geological Survey, 2006, The Lignite Reserves of North Dakota, North Dakota Geological Survey Report of Investigations No. 106.

Study Area (HDR)

UNIT DESCRIPTIONS

- Geology Undifferentiated
- Geology Undifferentiated
- Economic Coal Deposits

Economic coal deposits are those that meet the minimum criteria established by coal companies operating in the area. These criteria include a minimum cumulative thickness of 10 feet, a minimum individual bed thickness of at least 2.5 feet, a ratio of overburden to coal thickness of not more than 10:1, a minimum of 10 feet of overburden, and a minimum depth to coal of approximately 150 feet.

Geologic Symbols

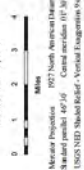
- Extent of Coal Lignite Reserves
- Data Points

Includes coal exploration (NGS) and lignite (deliberate, all-mineral) data points, as well as geologic and geologic data points.

Other Features

- Water
- Water - Intermittent
- Water - Seasonal
- Water - Perennial
- River/Stream - Perennial
- River/Stream - Intermittent
- Seasonal Channel

Scale 1:100,000



The North Dakota Geological Survey can provide information on demand for the 100K series. These maps would include information on available and backlogs. This project was completed by the U.S. Geological Survey, Department of Interior, under contract number 0228-00-0017, and 0228-00-0018.

**Appendix C –
North American Breeding Bird Survey Results**



Species List

North American Breeding Bird Survey Route

GLEN ULLIN

<u>Species</u>	<u>Birds/route</u>	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Pied-billed Grebe</u> <i>Podilymbus podiceps</i>	0.27	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Double-crest. Cormorant</u> <i>Phalacrocorax auritus</i>	0.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>American Bittern</u> <i>Botaurus lentiginosus</i>	0.60	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Turkey Vulture</u> <i>Cathartes aura</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Canada Goose</u> <i>Branta canadensis</i>	8.13	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Gadwall</u> <i>Anas strepera</i>	1.33	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Mallard</u> <i>Anas platyrhynchos</i>	22.27	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Blue-winged Teal</u> <i>Anas discors</i>	1.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Northern Shoveler</u> <i>Anas clypeata</i>	0.13	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Northern Pintail</u> <i>Anas acuta</i>	0.67	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Northern Harrier</u> <i>Circus cyaneus</i>	3.20	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Cooper's Hawk</u> <i>Accipiter cooperii</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Swainson's Hawk</u> <i>Buteo swainsoni</i>	2.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Red-tailed Hawk</u> <i>Buteo jamaicensis</i>	1.00	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Ferruginous Hawk</u>	0.27	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>

<i>Buteo regalis</i>				
<u>American Kestrel</u> <i>Falco sparverius</i>	0.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Prairie Falcon</u> <i>Falco mexicanus</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Gray Partridge</u> <i>Perdix perdix</i>	0.93	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Ring-necked Pheasant</u> <i>Phasianus colchicus</i>	102.73	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Sharp-tailed Grouse</u> <i>Tympanuchus phasianellus</i>	2.60	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Wild Turkey</u> <i>Meleagris gallopavo</i>	0.67	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Sora</u> <i>Porzana carolina</i>	0.40	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>American Coot</u> <i>Fulica americana</i>	0.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Killdeer</u> <i>Charadrius vociferus</i>	9.60	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Willet</u> <i>Catoptrophorus semipalmatu</i>	0.33	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Upland Sandpiper</u> <i>Bartramia longicauda</i>	16.67	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Marbled Godwit</u> <i>Limosa fedoa</i>	4.53	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Common Snipe</u> <i>Gallinago gallinago</i>	3.53	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Wilson's Phalarope</u> <i>Phalaropus tricolor</i>	0.80	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Ring-billed Gull</u> <i>Larus delawarensis</i>	0.73	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Rock Dove</u> <i>Columba livia</i>	2.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Mourning Dove</u> <i>Zenaida macroura</i>	84.87	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Black-billed Cuckoo</u> <i>Coccyzus erythrophthalmus</i>	0.13	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Great Horned Owl</u> <i>Bubo virginianus</i>	0.53	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Burrowing Owl</u> <i>Athene cunicularia</i>	0.33	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Short-eared Owl</u> <i>Asio flammeus</i>	1.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>

<u>Common Nighthawk</u> <i>Chordeiles minor</i>	0.80	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Belted Kingfisher</u> <i>Ceryle alcyon</i>	0.13	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Red-headed Woodpecker</u> <i>Melanerpes erythrocephalus</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Downy Woodpecker</u> <i>Picoides pubescens</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Hairy Woodpecker</u> <i>Picoides villosus</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Northern Flicker</u> <i>Colaptes spp.</i>	0.67	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Willow Flycatcher</u> <i>Empidonax traillii</i>	0.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Willow/Alder Flycatcher</u> <i>Empidonax spp.</i>	0.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Least Flycatcher</u> <i>Empidonax minimus</i>	0.80	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Say's Phoebe</u> <i>Sayornis saya</i>	1.53	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Western Kingbird</u> <i>Tyrannus verticalis</i>	23.00	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Eastern Kingbird</u> <i>Tyrannus tyrannus</i>	23.73	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Loggerhead Shrike</u> <i>Lanius ludovicianus</i>	0.73	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Warbling Vireo</u> <i>Vireo gilvus</i>	1.53	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Red-eyed Vireo</u> <i>Vireo olivaceus</i>	0.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Black-billed Magpie</u> <i>Pica pica</i>	0.33	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>American Crow</u> <i>Corvus brachyrhynchos</i>	1.47	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Horned Lark</u> <i>Eremophila alpestris</i>	134.13	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Tree Swallow</u> <i>Tachycineta bicolor</i>	1.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>N. Rough-winged Swallow</u> <i>Stelgidopteryx serripennis</i>	3.93	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Bank Swallow</u> <i>Riparia riparia</i>	40.07	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>
<u>Cliff Swallow</u>	7.20	<u>Route Change</u>	<u>Regional Change</u>	<u>Id Tips</u>

<i>Petrochelidon pyrrhonota</i>				
<u>Barn Swallow</u> <i>Hirundo rustica</i>	11.60	Route Change	Regional Change	Id Tips
<u>Black-capped Chickadee</u> <i>Poecile atricapillus</i>	0.07	Route Change	Regional Change	Id Tips
<u>Rock Wren</u> <i>Salpinctes obsoletus</i>	0.20	Route Change	Regional Change	Id Tips
<u>House Wren</u> <i>Troglodytes aedon</i>	3.33	Route Change	Regional Change	Id Tips
<u>Sedge Wren</u> <i>Cistothorus platensis</i>	0.20	Route Change	Regional Change	Id Tips
<u>Eastern Bluebird</u> <i>Sialia sialis</i>	0.07	Route Change	Regional Change	Id Tips
<u>American Robin</u> <i>Turdus migratorius</i>	12.40	Route Change	Regional Change	Id Tips
<u>Gray Catbird</u> <i>Dumetella carolinensis</i>	0.07	Route Change	Regional Change	Id Tips
<u>Brown Thrasher</u> <i>Toxostoma rufum</i>	1.33	Route Change	Regional Change	Id Tips
<u>European Starling</u> <i>Sturnus vulgaris</i>	3.40	Route Change	Regional Change	Id Tips
<u>Sprague's Pipit</u> <i>Anthus spragueii</i>	0.20	Route Change	Regional Change	Id Tips
<u>Cedar Waxwing</u> <i>Bombycilla cedrorum</i>	1.53	Route Change	Regional Change	Id Tips
<u>Yellow Warbler</u> <i>Dendroica petechia</i>	4.13	Route Change	Regional Change	Id Tips
<u>Common Yellowthroat</u> <i>Geothlypis trichas</i>	3.73	Route Change	Regional Change	Id Tips
<u>Chipping Sparrow</u> <i>Spizella passerina</i>	0.53	Route Change	Regional Change	Id Tips
<u>Clay-colored Sparrow</u> <i>Spizella pallida</i>	3.27	Route Change	Regional Change	Id Tips
<u>Vesper Sparrow</u> <i>Pooecetes gramineus</i>	4.53	Route Change	Regional Change	Id Tips
<u>Lark Sparrow</u> <i>Chondestes grammacus</i>	1.00	Route Change	Regional Change	Id Tips
<u>Lark Bunting</u> <i>Calamospiza melanocorys</i>	195.13	Route Change	Regional Change	Id Tips
<u>Savannah Sparrow</u> <i>Passerculus sandwichensis</i>	15.93	Route Change	Regional Change	Id Tips
<u>Grasshopper Sparrow</u> <i>Ammodramus savannarum</i>	23.67	Route Change	Regional Change	Id Tips

<u>Baird's Sparrow</u> <i>Ammodramus bairdii</i>	5.53	Route Change	Regional Change	Id Tips
<u>Le Conte's Sparrow</u> <i>Ammodramus leconteii</i>	0.07	Route Change	Regional Change	Id Tips
<u>Song Sparrow</u> <i>Melospiza melodia</i>	0.27	Route Change	Regional Change	Id Tips
<u>Chestnut-col. Longspur</u> <i>Calcarius ornatus</i>	68.53	Route Change	Regional Change	Id Tips
<u>Black-headed Grosbeak</u> <i>Pheucticus melanocephalus</i>	0.13	Route Change	Regional Change	Id Tips
<u>Lazuli Bunting</u> <i>Passerina amoena</i>	0.07	Route Change	Regional Change	Id Tips
<u>Dickcissel</u> <i>Spiza americana</i>	1.40	Route Change	Regional Change	Id Tips
<u>Bobolink</u> <i>Dolichonyx oryzivorus</i>	16.87	Route Change	Regional Change	Id Tips
<u>Red-winged Blackbird</u> <i>Agelaius phoeniceus</i>	110.87	Route Change	Regional Change	Id Tips
<u>Western Meadowlark</u> <i>Sturnella neglecta</i>	193.73	Route Change	Regional Change	Id Tips
<u>Yellow-head. Blackbird</u> <i>Xanthocephalus xanthocephala</i>	3.40	Route Change	Regional Change	Id Tips
<u>Brewer's Blackbird</u> <i>Euphagus cyanocephalus</i>	10.00	Route Change	Regional Change	Id Tips
<u>Common Grackle</u> <i>Quiscalus quiscula</i>	47.53	Route Change	Regional Change	Id Tips
<u>Brown-headed Cowbird</u> <i>Molothrus ater</i>	113.47	Route Change	Regional Change	Id Tips
<u>Orchard Oriole</u> <i>Icterus spurius</i>	1.00	Route Change	Regional Change	Id Tips
<u>Baltimore Oriole</u> <i>Icterus galbula</i>	0.80	Route Change	Regional Change	Id Tips
<u>Bullock's Oriole</u> <i>Icterus bullockii</i>	0.13	Route Change	Regional Change	Id Tips
<u>American Goldfinch</u> <i>Carduelis tristis</i>	4.07	Route Change	Regional Change	Id Tips
<u>House Sparrow</u> <i>Passer domesticus</i>	33.53	Route Change	Regional Change	Id Tips

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**Appendix D –
US Fish and Wildlife Service
And
North Dakota Fish and Game Department
Response Letters**

RECEIVED

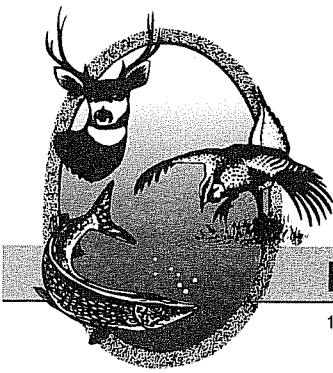
OCT 27 2010

HDR Engineering, Inc.

"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352



October 22, 2010

Bruce Moreira
Environmental Scientist
HDR Engineering, Inc.
701 Xenia Avenue South, Suite 600
Minneapolis, MN 55416

Dear Mr. Moriera:

RE: Antelope Hills Wind Project – Mercer County, North Dakota
Sunflower Wind Project – Morton & Stark Counties, North Dakota
Silver Sage Wind Project – Oliver County, North Dakota

The North Dakota Game and Fish Department has reviewed this project for wildlife concerns.

Our primary concern with wind power development is the disturbance of native prairie associated with construction of turbines, access roads, and other associated facilities. We ask that work within native prairie be avoided to the extent possible. This could include micro-siting turbines onto adjacent previously disturbed land, locating access roads on existing section line trails rather than across undisturbed native prairie, etc.

The Golden Valley Wildlife Management Area (WMA) is located in the west half of section 32, T146N, R89W, within the project boundary of the Antelope Hills Wind Project. The Wilbur Boldt WMA is located in the northeast quarter of section 34, T142N, R83W, immediately adjacent to the project boundary of the Silver Sage Wind Project. We ask that wind turbines be set-back from WMA's a sufficient distance to minimize possible disturbance to wildlife.

The National Wetland Inventory indicates numerous wetlands within the proposed project area. We recommend that any unavoidable wetland impacts be replaced in kind, above-ground appurtenances not be placed in wetland areas, and no alterations be made to existing drainage patterns.

We also recommend that routine monitoring for avian and bat mortality be included as part of the facility maintenance plan for the life of the project. We would appreciate being kept informed as this project progresses, and if possible, we would like the GPS coordinates for each turbine after the site has been established.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Schadewald". The signature is fluid and cursive, with the first name "Paul" being more prominent.

Paul Schadewald

Chief

Conservation & Communication Division

js



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501



DEC 1 2010

Mr. Bruce Moreira
Environmental Scientist
HDR Engineering, Inc.
701 Xenia Avenue South, Suite 600
Minneapolis, Minnesota 55416

Re: Sunflower Wind Project, Morton, and Stark
Counties
Antelope Hills Wind Project, Mercer County
Silver Sage Wind Project, Oliver County

Dear Mr. Moreira:

This is in response to your August 6, 2010, solicitation of views and comments letters for the proposed Sunflower, Antelope Hills, and Silver Sage Wind Projects. The proposed projects would be developed by Sunflower Wind Project, LLC, Antelope Hills Wind Project, LLC, and Silver Sage Wind Project, LLC, all subsidiaries of Infinity Wind Power (Infinity).

The projects would consist of typical wind project construction, including erecting wind turbines and constructing associated facilities such as gravel access roads, an underground electrical collector system, electrical collector substation, and overhead transmission lines. The final locations of the turbines, access roads, and the electrical collector system have not yet been identified.

The following areas may be affected by the project:

Sunflower Wind Project:

Morton County: T. 138 N., R. 90 W., Sections 4-6
T. 139 N., R. 90 W., Sections 16-23, 26-33
Stark County: T. 138 N., R. 91 W., Sections 1, 2
T. 139 N., R. 91 W., Sections 23-25, 35, 36

Antelope Hills Wind Project:

Mercer County: T. 145 N., R. 88 W., Section 6, 7
T. 145 N., R. 89 W., Section 1-12
T. 145 N., R. 90 W., Sections 1-2, 11, 12
T. 146 N., R. 89 W., Sections 29-32
T. 146 N., R. 86 W., Sections 14, 15, 21-28, 33-36

Silver Sage Wind Project:

Oliver County: T. 142 N., R. 83 W., Section 13, 14, 23-26, 35, 36
T. 142 N., R. 82 W., Sections 8, 16-18, 19-22, 27-34
T. 141 N., R. 82 W., Section 3, 4

We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), Executive Order 13186 "Responsibilities of Federal Agencies to Protect Migratory Birds", the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the National Environmental Policy Act (NEPA).

The U.S. Fish and Wildlife Service (Service) holds certain resources in trust and manages them for the benefit of the American people. These resources include migratory birds, inter-jurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge system. One goal of Service policy is that conservation of fish and wildlife resources receive equal consideration with other features of resource development, and that conservation actions are coordinated with those other forms of development. Another goal is to conserve, protect, and enhance fish and wildlife and their habitats to facilitate the balanced development of the Nation's natural resources.

Migratory Birds

Adequate consideration for avian and other wildlife resources early in the site evaluation process can help to minimize impacts and facilitate project review. Wind developers are encouraged to avoid impacts to prairie and other native habitats to the maximum extent practicable. Avoidance of impacts can be most effectively achieved by taking a landscape scale view, beginning with the process of prospecting for suitable sites for wind power development. Companies should assess not only those factors that indicate favorable conditions for development, such as a consistent wind resource, access to transmission, willing landowners, available financing, etc., but also anticipated impacts to wildlife and their habitats. Equal consideration should be accorded to wildlife resource conservation as to other features of development. When considering a project in a particular wind resource area, companies should use all available tools to ensure they have taken all practicable steps to avoid impacts to native habitats. This can be accomplished by utilizing GIS products depicting significant areas of contiguous prairie to site development in areas that are already impacted or fragmented. This analysis and potential site comparison should be accomplished prior to making any significant financial commitments, including entering into lease agreements with landowners. The Service's Interim Wind Turbine Siting Guidelines encourage project proponents to conduct a Potential Impact Index (PII) analysis on several potential sites within wind resource areas to assist in their selection of a wind power site that minimizes the potential to impact migratory birds and other wildlife. If the Service's interim guidelines were not used to evaluate potential sites for development, the project developer should indicate which method(s) they used to assess avian and other wildlife resource impacts before selecting this site for development. The alternatives analysis for the project should describe the

potential project sites that were evaluated and why they were rejected based on potential trust resource impacts.

The Service has coordinated with the Avian Power Line Interaction Committee (APLIC) to develop guidelines to assist companies in formulating Avian Protection Plans (APP). The guidelines can be accessed from APLIC's website at <http://www.aplic.org/>. These plans are utility specific and designed to reduce operational risks that result from avian interactions with electric utility facilities, but we suggest they may be adapted to wind energy facilities. Wind energy projects have the potential to negatively affect bats as well as avian species. Therefore, we encourage project developers to formulate an Avian and Bat Protection Plan (ABPP) if bats migrate through or may be present in the project area. The Service has issued an August 03, 2010, white paper with guidance related to the development of project specific ABPPs (enclosed) for renewable energy facilities. Some of the things that the Service looks for in an APP or ABPP are typically a statement of company policy confirming the company's commitment to work cooperatively towards the protection of migratory birds and bats; identification of the process under which the company will obtain and comply with all necessary permits, including, but not limited to, nest relocation, temporary possession, depredation, salvage/disposal, and scientific collection; discussion of the company's plan for monitoring and reporting all incidents of avian or bat injury or mortality; a commitment to make all reasonable efforts to construct and modify infrastructure to reduce the incidence of avian and bat mortality; a mechanism to review existing practices, ensuring quality control and allowing for adaptive management; and a plan for providing adequate training for all appropriate utility personnel. An APP or ABPP reporting system is important to help the company pinpoint areas of concern by tracking both the specific locations where mortalities may be occurring, as well as the extent of such mortalities and the remedial actions taken/planned to address identified problem areas.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "2006 Suggested Practices for Avian Protection on Power Lines". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends all new power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266, (1-800-334-5453) or visiting their website at www.eei.org.

The MBTA prohibits the taking, killing, possession, and transportation, (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted. While the Act has no provision for allowing unintentional take, the Service realizes that some birds may be killed during wind project construction and operation even if all known reasonable and effective measures to protect birds are used. The Office of Law Enforcement (OLE) carries out its mission to protect migratory birds through investigations and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to avoid take of migratory birds and by encouraging others to implement measures to avoid take

of migratory birds. It is not possible to absolve individuals, companies, or agencies from liability even if they implement bird mortality avoidance or other similar protective measures. However, OLE focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without identifying and implementing all reasonable, prudent, and effective measures to avoid that take. Companies are encouraged to work closely with Service biologists to identify available protective measures when developing project plans and/or avian protection plans, and to implement those measures prior to/during project construction and operation.

To the extent practicable, construction should be scheduled for late summer or fall/early winter so as not to disrupt waterfowl or other wildlife during the breeding season (February 1 to July 15). If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds, their eggs, or active nests, the Service recommends that the project proponent take all practicable measures to avoid and minimize take, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that if field surveys for nesting birds are conducted with the intent of avoiding take, that any documentation of the presence of migratory birds, eggs, and active nests, along with information regarding the qualifications of the biologist(s) performing the surveys, and any avoidance measures implemented at the project site be maintained. Should surveys or other available information indicate a significant impact to migratory birds, the Service requests that this office be contacted for further consultation on the extent of the impact and the long-term implications of the intended use of the project on migratory bird populations.

Bald and Golden Eagles

The BGEPA, prohibits anyone from taking bald eagles, including their parts, nests, or eggs without a permit issued by the Secretary of the Interior. The Act provides criminal and civil penalties for persons who take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof. The Act defines take as pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. "Disturb means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

While the bald eagle tends to be more closely associated with forested areas near water (Buehler 2000), they have been found nesting in single trees several miles from the nearest water body. Especially early in the nesting season, eagles can be very sensitive to disturbance near the nest site and may abandon their nest as a result of low disturbance levels, even from foot traffic. A

buffer of at least 1/2 mile should be maintained for all bald and golden eagle nests. A permit is required for any take of golden eagles or their nests. Permits to take golden eagles or their nests are available only for legitimate emergencies and as part of a program to protect golden eagles.

The Service is not currently aware of any bald or golden eagle nests in the immediate vicinity of the project areas. There are numerous documented bald eagle nests in Mercer, Morton, and Oliver Counties. The Service recommends surveying for bald and golden eagle nests out ½ mile from the proposed project areas. If any nests are found during the survey, the Service recommends that Infinity document the location and contact the Service for further coordination. The Service has developed national guidelines regarding bald eagle management and recommends that Infinity review these guidelines during the project planning process. The guidelines are available at <http://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf>.

Threatened and Endangered Species

A list of federally threatened and endangered species that may occur within the proposed project's area of influence is (enclosure 1). This list fulfills requirements of the Service under the ESA.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its delegated agent, is required to evaluate whether the action "may affect" listed species or critical habitat. This includes funding available from the U.S. Treasury Department under the American Recovery and Reinvestment Act. If the Federal agency or its designated agent determines the action "may affect, is likely to adversely affect" listed species or result in destruction or adverse modification of critical habitat, the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination for listed species or critical habitat, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit or license is required, the Federal agency may designate the fund recipient or permittee as its agent for purposes of informal section 7 consultation. The funding, permitting, or licensing Federal agency is responsible to ensure that its actions comply with the ESA, including obtaining concurrence from the Service for any action that may affect a threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.

The Aransas Wood Buffalo Population (AWBP) of whooping cranes is the only self sustaining migratory population of whooping cranes remaining in the wild. These birds breed in the wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

Endangered whooping cranes have been documented using stopover habitat in the vicinity of this proposed project area. The proposed project areas are located within those portions of the whooping crane migration corridor that include 75-95% of all confirmed whooping crane

sightings in North Dakota (enclosure 2). The presence of suitable roosting and feeding habitat for whooping cranes, and location within the whooping crane migration corridor, document the potential for whooping crane presence in the proposed project area. A wind energy project in this wind resource area has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota. Potential effects may be direct (e.g. collision mortality) or indirect (e.g. avoidance of the site resulting in cranes seeking alternate habitat). The best available information indicates that whooping cranes avoid stopover habitat that is developed with wind energy appurtenances, particularly wind turbines. This avoidance may deny them the use of important habitat, and thus may result in an adverse effect in the form of harm by significant habitat modification. Whooping cranes use migration stopover habitat opportunistically and may not use the same stopovers annually. Whooping cranes often stop wherever they happen to be late in the day when they find conditions no longer suitable for migration. This tendency can make for a very unpredictable pattern of stopover use, depending on daily weather conditions. The Service recommends mapping wetlands at the project site within one (1) mile of all turbines, identifying potentially suitable whooping crane stopover habitat, and analyzing the potential effects to migrating whooping cranes from loss of use of this habitat for migration stopovers.

The interactions of whooping cranes with wind turbines and wind farms are currently not fully known, although it is expected that these large birds with relatively low maneuverability are susceptible to mortality via collisions with turbines. The highest known source of mortality to fledged whooping cranes is from striking power lines. Currently, collisions with power lines have accounted for the death or serious injury of at least 46 whooping cranes since 1956. If power lines will be constructed in association with this project, the Service recommends they be placed underground to avoid collision mortality. If underground construction is not practicable, we recommend installation and maintenance of visual marking devices on all new power lines within one mile of potentially suitable whooping crane stopover habitat, and an equal length of existing power line in the whooping crane migration corridor within one mile of potentially suitable whooping crane habitat.

Any party is responsible to ensure that their activities comply with pertinent Federal Laws, including the ESA, BGEPA, and the MBTA, even in the absence of a Federal nexus. If an activity is likely to result in "take" of a federally-listed species, the project proponent or landowner has the option of developing a Habitat Conservation Plan (HCP) in consultation with FWS. Using the voluntary guidelines referenced above will help to ensure compliance with the MBTA and BGEPA. The Service requests that Infinity respond to the Service indicating how Infinity intends to demonstrate compliance with applicable Federal wildlife laws. While the projects' potential for take has not yet been determined, Infinity should note that if "take" of any federally listed threatened or endangered species is anticipated, Infinity is advised to develop an HCP and apply for an Incidental Take Permit (ITP).

Fish and Wildlife Service Property Interests

The Service administers Waterfowl Production Areas owned in fee title as well as wetland and

grassland easements throughout North Dakota. A review of Service realty records for the proposed project area indicates Service property interests are located in the proposed project area. Wetland easements are legal agreements with private landowners that permanently protect wetland basins from being drained, burned, leveled, or filled. Grassland easements are legal agreements with landowners that permanently protect grassland vegetation, primarily native prairie, from being destroyed or developed. Grassland easements prevent these grasslands from being converted to cropland. Mowing, haying, and grass seed harvesting must be delayed on grassland easements until after July 15 each year to protect grassland nesting birds. The primary responsibility in protecting these interests is to review all proposed uses to ensure that the requests are compatible with Service easement regulations and various laws and policies. These comments and suggestions are made in an attempt to accomplish three goals: 1) avoid impacts to Service grassland and wetland easements in the project area as much as possible; 2) if unavoidable, ensure that any proposed turbine and associated infrastructure impacts (roads, buried collection lines, transmission lines, sub-stations, etc.) on any Service easement areas are kept to an absolute minimum; and 3) investigate all potential alternatives to eliminate or reduce impacts to easement areas to protect the integrity of the easement.

High Value Habitat Avoidance

High value wildlife habitat types in North Dakota include native prairies, wetlands, wooded draws, and riparian forests. We recommend that construction of wind towers and appurtenant facilities in the above habitat types be avoided whenever possible.

Since the 1800s, North Dakota has lost approximately 75 percent of its native grasslands, primarily due to crop production. Native prairie has significant natural resource values including:

- Provides habitat for a number of migratory and resident grassland birds whose populations are declining.
- Provides nesting habitat for millions of waterfowl.
- Contains 200-300 plant species, which provide genetic diversity important to agriculture and medicine.
- Provides habitat for thousands of insects including the Dakota skipper, a candidate species for listing under the ESA, and other butterflies (Ex: Regal fritillary, Tawny crescent).
- Crucial for soil and water conservation.
- Provides recreational opportunities (hunting, bird watching/wildlife observation, hiking).
- Living laboratories for scientific research.

Our review of NWI maps indicates that wetland areas are located within the project areas. NWI data can be accessed directly by visiting their website at (wetlands.fws.gov). Section 404 of the Clean Water Act regulates placement of fill materials in certain wetlands. A Corps of Engineers' 404 permit may be required if fill material will be placed in aquatic sites, including wetlands.

The project proponent should contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine their permit requirements. If a 404 permit is required, the Service will also provide recommendations on this project to the Corps.

Construction activities should be conducted in a manner that will minimize impacts to the wildlife and the existing habitat in the project area. To help avoid impacts, we recommend the project proponent:

- Reseed disturbed native prairie with a diverse native grass/forb seed mixture. Obtain seed stock from nurseries within 250 miles of the project area to insure the particular cultivars are well adapted to the local climate.
- Minimize grassland disturbance by using fewer, larger turbines, and limiting new road construction.
- Design meteorological towers to be self standing (no guywires). If towers must be guyed, install and maintain appropriate visual line marking devices to reduce the potential for avian collision mortality
- Locate appurtenant facilities to avoid placement of fill in wetlands along the route.
- Install and maintain appropriate erosion control measures to reduce sedimentation and water quality degradation of wetlands and streams near the project area.
- Replace unavoidable wetland losses with functionally equivalent wetlands.

Research, Monitoring, and Assessment

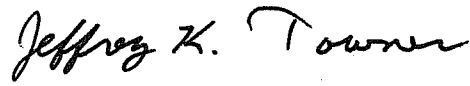
We recommend project proponents conduct collision monitoring studies designed to determine the effect of several factors, such as site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites, on bird deaths. Annual reports outlining the results of these monitoring studies should be submitted to this office. The Avian Subcommittee of the National Wind Coordinating Committee (NWCC) has developed a guidance document to assist wind energy developers in designing studies that will produce credible and comparable results of avian interaction with wind power plants. The NWCC document, "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites," can be obtained by contacting the National Wind Coordination Committee, c/o RESOLVE, 1255 23rd Street, Suite 275, Washington, D.C. 20037, or by visiting their website at (www.nationalwind.org).

We wish to stress the importance of implementing the recommendations contained in this letter, and of coordinating in a substantive and ongoing way with this office as your project planning proceeds. The way in which your company implements the Service's recommendations will determine whether or not your projects can be certified as complying with Federal wildlife laws.

Thank you for the opportunity to provide comments. If you require further information as

project planning proceeds, please contact Breanne Vander Naald of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,

A handwritten signature in black ink that reads "Jeffrey K. Towner". The signature is written in a cursive, flowing style.

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosures (3)

cc: Army Corps of Engineers, Bismarck
(Attn: Dan Cimarosti)
Director, ND Game & Fish, Bismarck
(Attn: Paul Schadewald)

Wind Power GeoPlanner™

Licensed Microwave Report

Sunflower Wind Project



Prepared on Behalf of
Sunflower Wind Project,
LLC

September 27, 2010





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1. Introduction

The use of wind energy, one of the oldest forms of harnessing a natural energy source, is now one of the world's fastest growing alternative energy sources. The United States is committed to the use of wind energy, and over the next several years billions of dollars will be spent on wind power projects. However, as new wind turbine generators are installed around the country, it is important to note that they may pose an interference threat to existing microwave systems and broadcast stations licensed to operate in the United States.

Wind turbines can interfere with microwave paths by physically blocking the line-of-sight between two microwave transmitters. Additionally, wind turbines have the potential to cause blockage and reflections ("ghosting") to television reception. Blockage is caused by the physical presence of the turbines between the television station and the reception points. Ghosting is caused by multipath interference that occurs when a broadcast signal reflects off of a large reflective object—in this case a wind turbine—and arrives at a television receiver delayed in time from the signal that arrives via direct path.

Many states and other jurisdictions recognize the need for regulations addressing interference to radio signal transmissions from the wind turbine installations. Specifically, local planning authorities typically require project developers to ensure wind turbines will not cause interference. In some cases they require developers to notify the telecommunication operators in the area of the proposed wind turbine installation. Other factors prompting developers to undertake proactive investigation into potential interference include the need to prevent legal and regulatory problems and the desire to promote goodwill within the community—a good neighbor approach.

Comsearch has developed and maintains comprehensive technical databases containing information on licensed microwave networks throughout the United States. Microwave bands that may be affected by the installation of wind turbine facilities operate over a wide frequency range (900 MHz – 23 GHz). These systems are the telecommunication backbone of the country, providing long-distance and local telephone service, backhaul for cellular and personal communication service, data interconnects for mainframe computers and the Internet, network controls for utilities and railroads, and various video services.

This report focuses on the potential impact of wind turbines on licensed non-federal government microwave systems. Comsearch provides additional wind energy services, a description of which is available upon request.

2. Summary of Results

An overall summary of results appears below.

Project Information

Name: Sunflower Wind Project

County: Stark and Morton

State: North Dakota

Total Microwave Paths	Paths with Obstructions	Total Turbines	Turbine Obstructions
15	N/A	N/A	N/A

Methodology

Our obstruction analysis was performed using Comsearch's proprietary microwave database, which contains all non-government licensed paths from 0.9 - 23 GHz¹. First, we determined all microwave paths that intersect the area of interest². The area of interest was defined by the client and encompasses the planned turbine locations. Next, for each microwave path that intersected the project area, we calculated a Worst Case Fresnel Zone (WCFZ). The mid-point of a full microwave path is the location where the widest (or worst case) Fresnel zone occurs. Fresnel zones were calculated for each path using the following formula.

$$Rn \cong 17.3 \sqrt{\frac{n}{F_{GHz}} \left(\frac{d_1 d_2}{d_1 + d_2} \right)}$$

Where,

- R_n = Fresnel Zone radius at a specific point in the microwave path, meters
- n = Fresnel Zone number, 1
- F_{GHz} = Frequency of microwave system, GHz
- d_1 = Distance from antenna 1 to a specific point in the microwave path, kilometers
- d_2 = Distance from antenna 2 to a specific point in the microwave path, kilometers

For worst case Fresnel zone calculations, $d_1 = d_2$

¹ Please note that this analysis does not include unlicensed microwave paths or federal government paths that are not registered with the FCC.

² We use FCC-licensed coordinates to determine which paths intersect the area of interest. It is possible that as-built coordinates may differ slightly from those on the FCC license.

The calculated WCFZ radius, giving the linear path an area or swath, buffers each microwave path in the project area. See the Tables and Figures section for a summary of paths and WCFZ distances. In general, this is the two-dimensional area where the planned wind turbines should be avoided, if possible. A depiction of the WCFZ overlaid on topographic basemaps can be found in the Tables and Figures section, and is also included on the enclosed spreadsheet and shapefiles³.

Discussion of Potential Obstructions

For this project, turbine locations were not provided; thus we could not determine if any potential obstructions exist between the planned wind turbines and the incumbent microwave paths. If the latitude and longitude values for turbine locations are provided, Comsearch can identify where a potential conflict might exist.

³ The ESRI® shapefiles enclosed are in NAD 83 UTM Zone 13 projected coordinate system.

3. Tables and Figures

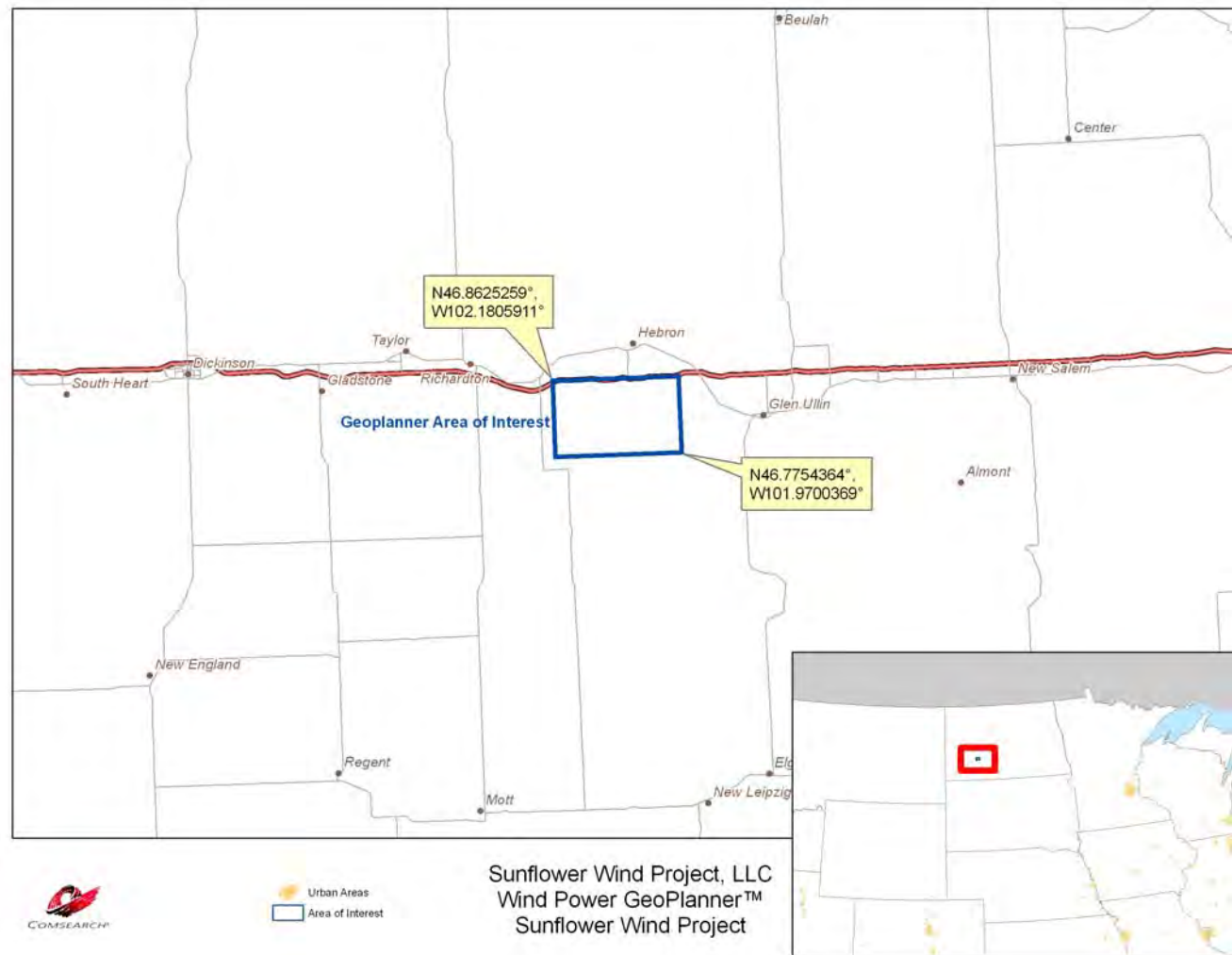


Figure 1: Area of Interest

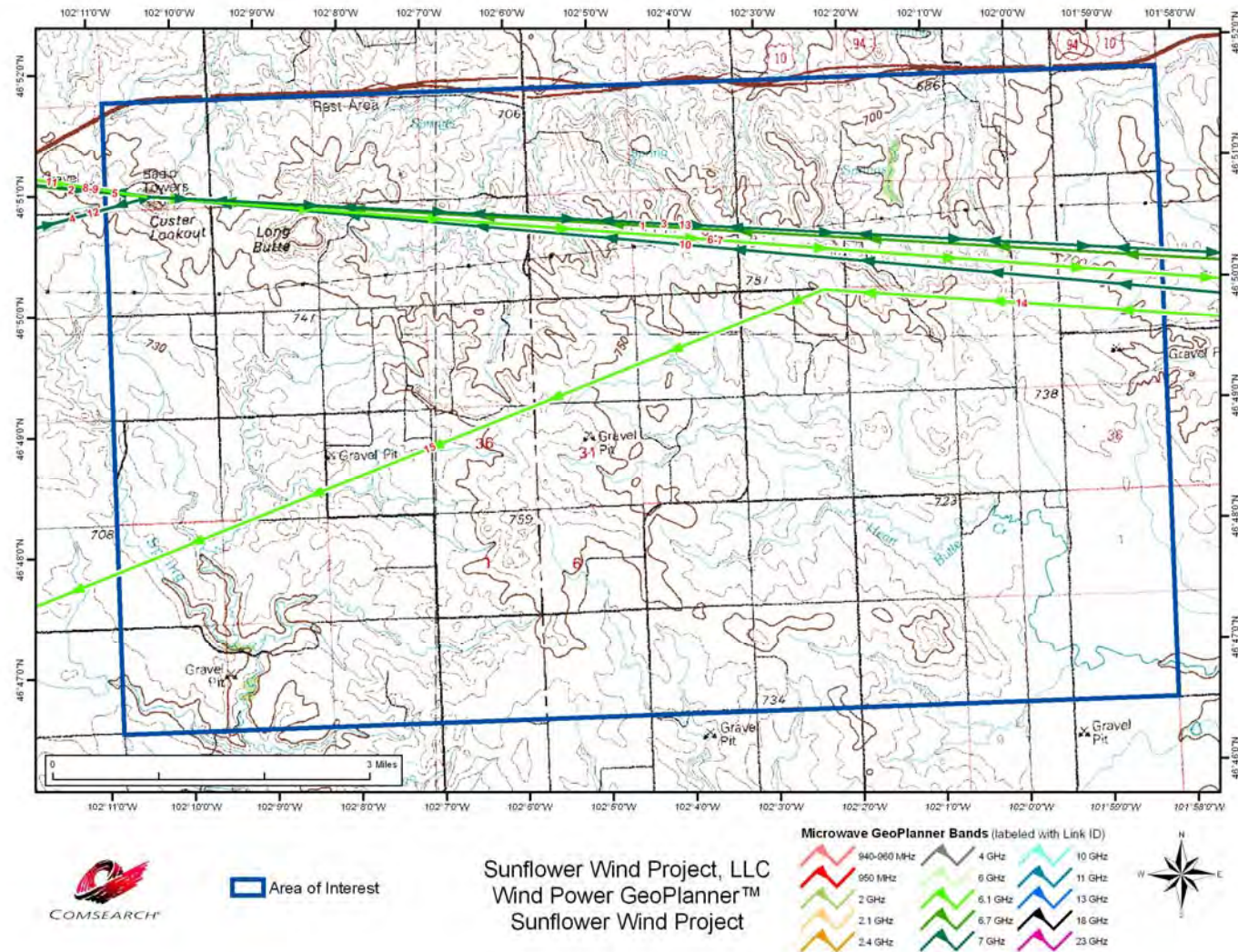


Figure 2: Microwave Paths that Intersect the Area of Interest





ID	Site Name 1	Site Name 2	Callsign 1	Callsign 2	Band	Licensee	WCFZ (m)
1	NEW SALEM	ANTELOPE	KVY57	KVY59	Upper 6 GHz	BNSF Railway Company	25.61
2	OLD HWY 10	ANTELOPE	KVY58	KVY59	Upper 6 GHz	BNSF Railway Company	20.87
3	NEW SALEM	ANTELOPE	WHB888	RXONLY	7 GHz	PRAIRIE PUBLIC BROADCASTING INC	25.03
4	ANTELOPE	DICKINSON	WHB889	RXONLY	7 GHz	PRAIRIE PUBLIC BROADCASTING INC	25.00
5	DICKINSON	ANTELOPE	WHQ215	RXONLY	7 GHz	HOAK MEDIA OF DAKOTA LICENSE, LLC	22.44
6-7	CUSTERS LOOK	NEW SALEM	WPON243	WPON242	Lower 6 GHz	Peach Acquisitions LLC	26.67
8-9	DICKINSON	CUSTERS LOOK	WPON244	WPON243	Lower 6 GHz	Peach Acquisitions LLC	22.87
10	NEW SALEM	ANTELOPE	WPON897	RXONLY	7 GHz	PRIME CITIES BROADCASTING, INC.	25.04
11	ANTELOPE	DICKINSON	WPON898	RXONLY	7 GHz	PRIME CITIES BROADCASTING, INC.	21.51
12	KDSE TX	ANTELOPE	WPSI941	RXONLY	7 GHz	PRAIRIE PUBLIC BROADCASTING INC	25.01
13	ANTELOPE	NEW SALEM	WPSI987	RXONLY	7 GHz	PRAIRIE PUBLIC BROADCASTING INC	25.03
14	NEW SALEM	HEBRON	WPYN766	WPYN767	Lower 6 GHz	PRAIRIE PUBLIC BROADCASTING INC	24.22
15	HEBRON	LEFOR	WPYN770	WPYN757	Lower 6 GHz	PRAIRIE PUBLIC BROADCASTING INC	23.80

Table 1: Microwave Paths that Intersect the Area of Interest

*(See enclosed mw_geopl.xls for more information and
GP_dict_matrix_description.xls for detailed field descriptions)*



4. Contact Us

For questions or information regarding the Licensed Microwave Report, contact:

Contact person:	Denise Finney
Title:	Account Manager
Company:	Comsearch
Address:	19700 Janelia Farm Blvd., Ashburn, VA 20147
Telephone:	703-726-5650
Fax:	703-726-5595
Email:	dfinney@comsearch.com
Web site:	www.comsearch.com



October 1, 2010

Mr. Jon Koehn
Infinity Wind Power, Inc.
3760 State Street, Suite 102
Santa Barbara, CA 93105

Re: Sunflower ND Project, 10-N-0614.004

Dear Mr. Koehn:

Pursuant to your request, Aviation Systems, Inc. (ASI), has performed an initial evaluation of the feasibility of the Sunflower ND Project. The purpose of the study is to determine the feasibility of erecting wind turbines with a tip height of up to 428 feet above ground level (AGL), from an aviation and airspace point of view. We have reviewed the above referenced project against aviation and airspace criteria set forth in Federal Aviation Regulation (FAR) Part 77 (14 CFR 77) *Objects Affecting Navigable Airspace*; FAA Order 8260.3B, the *United States Standard for Terminal Instrument Procedures (TERPs)* and; FAA Order JO 7400.2G, *Procedures for Handling Airspace Matters*. The criteria in these documents comprise the factors the Federal Aviation Administration (FAA) will use in evaluating the aeronautical compatibility of the project when it is submitted for their official regulatory review. Our findings include the following:

- The project consists of proposed wind turbines to be located within an approximate area 6.38 x 4.19 nautical miles (NM) in the State of North Dakota.
- Ground elevations within the area range from 2300 feet above mean sea level (AMSL) to 2670 feet AMSL. With a proposed turbine height of 428 feet AGL, the highest point of the project could be up to 3098 feet AMSL. See attached map depicting the project and surrounding area.
- The nearest public airport is Glenn Ullin Regional (D57) Airport, located 7.98 NM, east of the project centerpoint. The project would not impact airport operations.
- The project would not impact Minimum Vectoring Altitudes (MVA) or Enroute Low Altitude Airways.
- The project is outside the boundaries of any Military Operations Areas or Restricted Areas.
- Development is unlikely to impact Air Defense and Homeland Security radars (Green Zone on Federal Radar and Military Airspace Preliminary Screening Tool). Further radar impact study is not necessary.

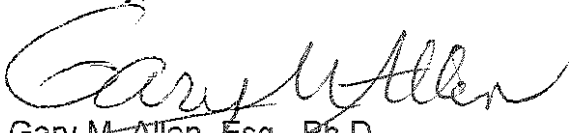
- Minimal to no impact to Weather Surveillance Radar-1988 Doppler (WSR-88D) weather radar operations. Further radar impact study is not necessary.
- In the east section of the project, within the broken green map line, a future RNAV (GPS) Approach to Runway 11 at D57 may limit structure heights below 3148 feet AMSL.
- The following list of Sunflower ND Project Sectors indicates the vertical AMSL limits of each listed procedure:
 - Sector A: 3148' AMSL – “Target Height”
- Within Sector A, 428 foot turbines are feasible and should receive Determinations of No Hazard from the FAA.

Additionally, any structure over 200 feet AGL, in this case the turbines, requires notice to the FAA and also would require lighting in accordance with FAA Advisory Circular (AC) 70/7460-1K, Change 2. After suitable locations are selected and at your request, ASI can handle the FAA filing process pursuant to the notice requirements of FAR Part 77 and follow-up until the No Hazard Determinations are issued by the FAA. We will be able to negotiate selective lighting so that not all of the turbines would require the extra expense of installing and maintaining lights.

FAA makes changes to the National Aviation System everyday. New approaches are published, departure procedures are changed, new runways are planned, MVAs are modified, etc. Therefore, it is possible for the study findings to become obsolete in a relatively short time period. We recommend that prior to filing specific sites within the study area, the study findings be reviewed for currency. Studies greater than 12 months old should automatically be re-visited and their findings confirmed.

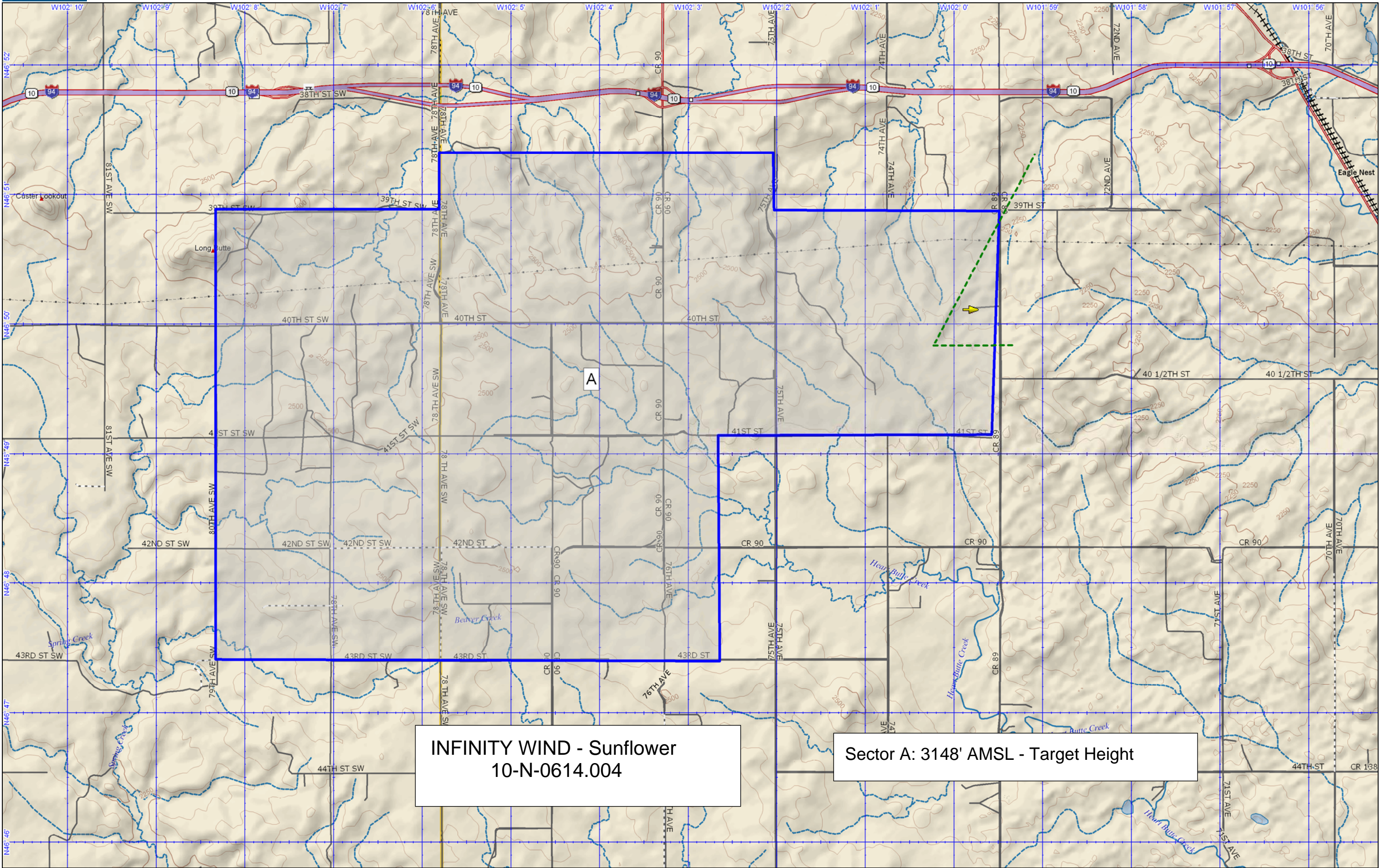
Our findings are intended as a planning tool, in conjunction with the resolution of other pertinent issues. Actual construction activities are not advisable until the FAA Determinations of No Hazard are issued.

Sincerely,



Gary M. Allen, Esq., Ph.D.
President

Attachments



INFINITY WIND - Sunflower
10-N-0614.004

Sector A: 3148' AMSL - Target Height